

D 1-38/2:3/1

# DEPARTMENT OF DEFENSE COST REDUCTION JOURNAL



Critique by a Cost Reducer (page 5)



THE SYSTEM AFTER FIVE YEARS . . . . .	
A.F. TACTICAL FORCES: VIETNAM AND BEYOND . . . . .	9
AWARDS FOR IDEAS— Who Rates Higher: Government or Industry? . . . . .	19
INNOVATION: A Professorial Commentary . . . . .	33



WINTER 1966-67

Volume III, Issue No. 1

# Cost Reduction Journal



## ARTICLES

Cost Reduction: Progress and Prospect.....

ROBERT S. McNAMARA

Page  
5

Enhancing the Effectiveness of Air Force Tactical Forces.....

HAROLD BROWN

9

A Cost Conscious Work Force.....

JOHN W. MACY, JR.

19

How Much Will it Cost?.....

ERNEST J. JOSS

J. STERLING LIVINGSTON

JOHN A. WANDER

26

Innovation.....

EDWARD BARNET

33

Quality and Reliability Assurance (Part II) ..

JOHN RIORDAN

39

## FEATURES

Mona Lisa: A Study in Remote Supply.....

7

DIPEC: Tool-Saver For Defense.....

15

Alaskan Savings Avalanche.....

36

## REPRINTS

Resources Management and Project Prime...

30

Published by the Directorate for Cost Reduction Policy, Office of the Assistant Secretary of Defense (Installations and Logistics).

**Honorable PAUL R. IGNATIUS**  
Assistant Secretary of Defense  
(Installations & Logistics)

**Mr. PAUL H. RILEY**  
Deputy Assistant Secretary of Defense  
(Supply and Services)

**Mr. HARRELL B. ALTIZER**  
Director for Cost Reduction Policy

Editor..... **EDWARD E. OPPENHEIM**

### Contributing Editors

Army (Raymond C. Chase, Jr.)... OX 7-8487 (ac 202)  
Room 1D569, Pentagon, Washington, D.C.

Navy (Oliver G. Green)..... OX 6-4393 (ac 202)  
Room H-116, Main Navy Building, Washington, D.C.

Air Force (S. M. Funk)..... OX 7-6034 (ac 202)  
Room 4E269, Pentagon, Washington, D.C.

DSA (L. M. Sundquist)..... OX 8-1176 (ac 202)  
Room 3C390, Cameron Station, Washington, D.C.

The Cost Reduction Journal is published quarterly by the Directorate for Cost Reduction Policy, Office of the Assistant Secretary of Defense (Installations and Logistics), for distribution within the Department of Defense.

The Cost Reduction Journal seeks to stimulate cost reduction ideas, promote cost consciousness, and enhance understanding of efficiency programs. The Journal's content includes: (1) cost reduction goals and accomplishments; (2) policies and procedures of the cost reduction system; (3) cost reduction techniques and processes in all functional areas from which savings are derived; (4) new developments in concepts and philosophy that affect cost reduction objectives; and (5) specific cost reduction examples, with attribution where appropriate.

Unless otherwise indicated, Journal material may be reprinted provided: (1) credit is given to the Journal and the author; and (2) a single copy of the reprint is forwarded to the Journal.

Inquiries dealing with the Journal's policy and content may be directed to: Editor, Department of Defense Cost Reduction Journal, Room 2B322, Pentagon, Washington, D.C. 20301.

The Journal is available on subscription from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, \$1 a year domestic, 25 cents additional for foreign mailing. Single copy 25 cents.

## BORING BIRD PIQUES INTEREST

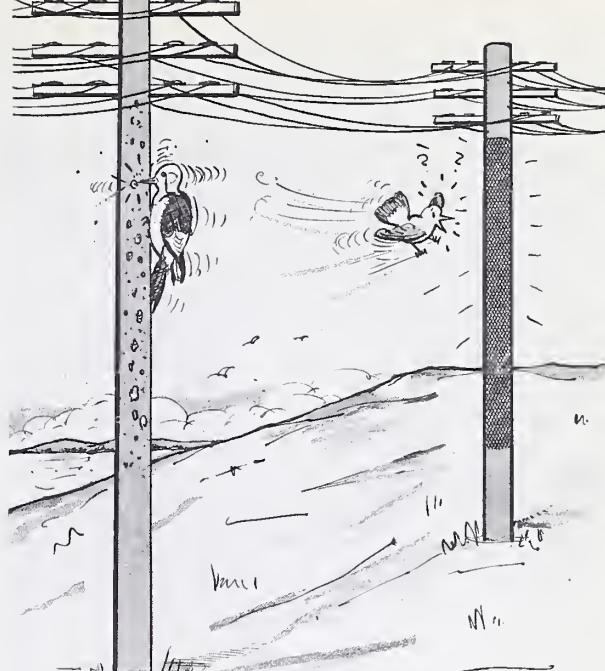
How much wood would woodpeckers peck if woodpeckers would peck wood? Answer: Fifty utility poles a year. Woodpeckers ruined that many light and power poles each year at the Louisiana Army Ammunition Depot until base maintenance adopted a sure-fire stopper.

Water and fungi enter holes drilled by the birds and cause rot. Pole rot comes in two forms: heart and shell. Deterioration of the pole core leaving the pole surface unscathed is called heart rot. Peeling of the pole surface (which weakens pole resistance to the elements) is called shell rot. Either condition causes pole replacement. Replacing a single pole costs \$95 in labor and material.

Over the years maintenance engineers vainly tried to prevent the damage. Poles were painted with preservatives. The birds pecked away. Poles were sprayed with poison. The birds ate it up. Holes were filled with cement. The birds pecked around it. Nothing worked.

The engineers then surrounded the problem they had not been able to penetrate. They wrapped the pole in hardware cloth (galvanized fine mesh screen) from below the lowest crossarm to 6 feet above the ground. The birds do not peck the exposed pole below the screen (perhaps because of predatory animals); they cannot peck through the screen; and they do not peck the exposed pole above the screen (perhaps because the wires on the crossarms hum).

Hardware cloth is a standard stock item (GSA Stock No. 553-559-861-03). It is available in 100 foot rolls of 36-inch widths with  $\frac{1}{4}$  inch mesh. The labor and



material cost of wrapping one pole is \$13.

This technique, jointly developed by the Depot and Louisiana Power and Light Company, saved the Depot \$4,100 last year. Mr. J. E. Davis, Manager of the Electrical Department at the Depot, was the Depot's chief liaison for the joint effort. The Depot is a Government-owned contractor-operated plant (Sperry Rand Corporation) whose savings are reported in the Contractor Cost Reduction Program and not in the in-house DoD Program.

Engineering Technician Kenneth A. Funk, a cost reduction officer at the Army Ammunition Procurement and Supply Agency in Joliet, Illinois, filled in the Journal on the details. □

## SURE CURE FOR BREAKS AND PANES



Chilly Alaskan winds, which raised havoc with door and window glass in family quarters at Fort Greely, caused glass replacement in some storm doors as often as seven times a year.

Post Engineers were glassy-eyed from trying to figure ways to stop these shattering experiences.

Enter Paul McCubbin, Office of the Post Engineer, who saw through the problem. He substituted "plex-a-glass" for the damaged glass in the doors and windows. McCubbin, who recently transferred to Fort Richardson, Alaska, received an award of \$40 for his idea which saved \$7,800 last year.

Apart from the savings, the improvement is greatly appreciated by mothers of those small tykes who sometimes forget to open the doors before going through them. □

# PRESIDENT APPOINTS MOOT SBA DEPUTY



**Robert Moot—Departs for SBA**

The Small Business Administration has a new Deputy Administrator. He is Mr. Robert C. Moot who, as Deputy Assistant Secretary of Defense (Logistics Services), guided policy for the Defense Cost Reduction Program from June 24, 1965, to December 19, 1966. During his custodianship, the Program completed the initial 5-year phase and progressed into the follow-on phase.

President Johnson announced the SBA appointment at a press conference on November 13. The President stated: "Mr. Moot brings exceptional ability and broad experience to the agency's top management team."

As Deputy Assistant Secretary for Logistics Services, Mr. Moot was charged with several important responsibilities in addition to the Cost Reduction Program. These assignments included policy formulation and management in the fields of telecommunications, transportation and warehousing, contract support services and food services.

Robert Moot is a veteran of 20 years of Federal service in managerial positions of progressively increasing responsibility. Immediately prior to his assignment as Deputy Assistant Secretary for Logistics Services, he served as Comptroller of the Defense Supply Agency.

He was selected to be DSA's first Comptroller in 1961 while he was serving as Director for Supply Management Policy in the Office of the Assistant Secretary of Defense (Supply and Logistics). His previous Government employment included several years as Comptroller of the Bureau of Supplies and Accounts, Navy Department. He was born and educated in New Jersey and served in the Army during World War II.

The Journal's readers are indebted to "Bob" Moot for the Journal's evolution from a "cross-feed" newsletter into one of the Government's most widely read, management-oriented publications.

Assistant Secretary of Defense Paul R. Ignatius said: "Mr. Moot's departure will be a real loss to the Department of Defense, but we must expect that the abilities of our able people will be recognized."

The Defense Cost Reduction Program is now under the leadership of Mr. Paul Riley, Deputy Assistant Secretary (Supply & Services), who guided the Program from its inception up to the time that Mr. Moot joined the OSD staff in June 1965. Mr. Riley recently received a National Civil Service League Award as one of the 10 outstanding civilians in the Federal Government.

There have been several other major functional reassignments incident to Mr. Moot's departure. In addition to cost reduction program policy, transportation and warehousing, telecommunications policy, and food services management have been transferred to Mr. Riley. Also, the Office of Technical Data and Standardization Policy will report to Mr. Riley instead of directly to Mr. Ignatius, as heretofore. The responsibility for contract support services policy has been assigned to Mr. Glenn V. Gibson, Deputy Assistant Secretary. In order for Mr. Riley to undertake the additional responsibilities assigned to him, the Directorate for Weapons Analysis and Readiness has been transferred from his supervision to Major General A. T. Stanwix-Hay, recently designated Deputy Assistant Secretary (Materiel).

**Paul Riley—Heads Cost Reduction**



# COST REDUCTION

## Progress and Prospect

By ROBERT S. McNAMARA

*Secretary of Defense*

### FY 1961-FY 1966

The initial, five-year phase of the Department of Defense Cost Reduction Program ended six months ago. We are now six months into a successor phase—one that is a planned development of the five-year effort. This seems an appropriate time to take stock of the Program's progress and to appraise its future.

My first progress report on the Program was submitted to President Kennedy on July 5, 1962. In that report I discussed future goals for major areas of the Program and predicted that within five years the cost of the Department's logistical operations would be cut by at least \$3 billion per year. In the fiscal year which ended on June 30, 1966, the annual savings rate was \$4.5 billion or 50% higher than my original estimate.

The record is impressive. Efficiencies between July 1961 and July 1966 cumulatively saved \$14 billion, or five cents out of each dollar appropriated in that period. The techniques of economy practiced in the Department of Defense are being adopted by all major elements of our Government. The President has said that he is determined "to bring the administrative practices of the entire Federal Government to the same hard, lean, and alert effectiveness that we expect and have received from our Armed Forces."



Every man and woman in Defense can be proud of these accomplishments.

The table below shows, by program elements, annual savings from FY 1962 through FY 1966 and the total saved in that period.

### Basic Framework

The future promises continued success—primarily because the Program's fundamentals have not changed.

The Assistant Secretary of Defense (Installations & Logistics) still manages the Program; the Assistant

### DEPARTMENT OF DEFENSE COST REDUCTION PROGRAM [In millions of dollars]

Category	Savings realized in—					
	FY 1962	FY 1963	FY 1964	FY 1965	FY 1966	Total
A. Buying only what we need.....	412	860	1,521	2,555	1,665	7,013
B. Buying at the lowest sound price.....	160	237	553	1,150	1,235	3,335
C. Reducing operating costs...	178	289	757	1,138	1,563	3,925
<b>Total program.....</b>	<b>750</b>	<b>1,386</b>	<b>2,831</b>	<b>4,843</b>	<b>4,463</b>	<b>14,273</b>

Secretary of Defense (Comptroller) still audits it.

The same guiding principles apply: buy only what is needed, buy at the lowest sound price, and reduce operating costs. Likewise, the test of progress is unchanged. Savings, to be counted, must result from a "new, improved, or intensified management action" and must be quantifiable. This means simply that some clearly demonstrable brainwork or added managerial emphasis has directly caused the cost reduction, that the "before" and "after" situations are specifically definable, and that the net difference between these situations lends itself to an expression in dollars.

Finally, the nature of a saving remains the same. Its effect must be to reduce costs or obligations for specific items or activities below the level contained in the President's budget as submitted to the Congress, or below the level appropriated, apportioned, or made available.

These criteria—the foundation of any governmental cost reduction program—have not changed.

### **Improvements**

Some system refinements and procedural changes have emerged—evolving logically from our extensive experience in managing the Program. These refinements are consistent with improvements suggested by a leading firm of public accountants (Touche, Ross, Bailey and Smart) who, at our request of a year ago, thoroughly evaluated the Program.

The sharpening of procedures has had the effect of making the Program easier to understand, administer, and audit.

### **Classes of Savings**

Savings categories have been reduced and simplified. Basically, there are now only two kinds of savings: those realized from actions taken in the current fiscal year; those that will be realized in the next two fiscal years from actions taken in the current fiscal year. (One of the twenty-five program areas does have an additional class of savings: the long-range impact of a decision to close, partially or completely, a military base or installation will continue to be separately identified and reported.)

### **Base Year**

The base year, i.e., the year from which all progress in the Program is measured, has been moved closer to the years for which progress is being measured. The system for the five-year program measured accomplishment against FY 1961. In the current system, the base year is always the year immediately preceding the

one in which the action is taken. Thus, there is a new base year for each new year of cost reduction activity. This "floating" base year imparts currency to annual comparisons and sharpens incentives by setting higher, more recent starting points.

### **Recurrence Limited**

We have shortened the period for crediting the future effects of an action. Many efficiencies instituted in one year generate savings in ensuing years. Formerly, these effects were reported in all subsequent years in which they recurred within the five-year span. In the current system, the recurrence is reported only for the two years following the year in which the action is taken. This two-year span is necessary to assure that savings actions are finalized by being reflected in the annual budget processing cycle. The total three-year cycle satisfies the data requirements for the budget formulation process.

### **One-Time Reporting**

Recordkeeping is easier. Previously, an action was re-evaluated and resubmitted in all subsequent years in which its benefits recurred. Now an action is reported once only—in the year in which it is taken. The action's realized benefits for that year and its estimated savings benefits for the two succeeding years are reported at the same time.

### **Goals**

DoD reporting components will recommend their own goals. The Assistant Secretary of Defense for Installations and Logistics will evaluate the reasonableness of the recommended goals. The auditors will not be involved in reviewing goals but will concentrate on assuring that reported savings actions are valid.

### **The Future**

Annual savings in the Program should continue to be substantial.

I foresee no let-up in emphasis on cost reduction—from the President on down. If anything, the fiscal needs of Vietnam and this Nation's civilian programs are intensifying the pressures to find new and better ways to stretch our resources.

We in Defense are fortunate in having had a head start in meeting this challenge. Our experience will stand us in good stead. The 4½ million people in Defense—military and civilian—can capitalize on the momentum they themselves have generated to keep this Department out in front in fiscal responsibility. I am positive they will do so. □

# **OPERATION MONA LISA—A LOGISTICS MASTERPIECE**



***Operation Mona Lisa re-supply ship awaits barges to offload cargo for movement to remote duty stations.***

Mention "Mona Lisa" to any of the thousands of men assigned to Alaskan Air Command's remote duty stations and he will know you are not thinking of daVinci's famous lady with the subtle smile. To him, "Mona Lisa" is the nickname for the special annual resupply of over 70 aircraft control distant early warning (DEW Line), White Alice, and other special project sites located in Alaska.

This once-a-year deepwater delivery system fully supplies 12-month daily needs to remote Alaskan sites. "Mona Lisa" provides food, fuel, vehicles, construction materials, miscellaneous equipment, and anything else that can be stored for 6 months to one year. Air Force likes to say that "Mona Lisa" takes care of everything from dozer blades to razor blades.

***Supplies are barged to shore for offloading.***



## **Three Phases**

There are three general phases in Operation "Mona Lisa". Phase One consists of determining next year's requirements and submitting requisitions and purchase requests to suppliers in the contiguous United States (referred to by remote station personnel as the "South 48"). These activities usually take place from September through December.

Phase Two calls for completed supply action by Air Force, Army, and DSA depots, and the General Services Administration, and for transporting the supplies to the staging area of Pier 91, Seattle, Washington. These activities are accomplished January through May.

***Cargo is off-loaded from "mother ship".***





*Over-the-beach unloading of supplies.*

The final segment of the operation, Phase Three, involves moving the cargo from ports of origin (such as Seattle, Washington, and Dutch Harbor, Alaska) to final destination. This activity usually occurs from May through September.

In 1966, more than 115,000 tons of supplies were delivered to "Mona Lisa" destinations in five sea-going barges, numerous tugs and LST-type barges, and six special, shallow-draft, river barges. The value of this cargo was close to \$9 million. The cost to transport it to the remote station areas was about \$4 million.

### **Transportation Difficulties**

The many sites served by the resupply operation are virtually inaccessible over land, and accessible by water from one-and-a-half to—at most—4 months each year. Air service is the only year-around method of delivery and this is reserved for mail, perishables, "Hi-Value" items, emergency supplies, and radar communications components.

Weather is a major problem in the "Mona Lisa" program. A slow breakup of the icepack can delay deliveries as much as 2 weeks. A sudden storm can bring all movement of supplies to a sudden halt, and in some cases result in loss or destruction of equipment. For example, in the Bering Sea area a strong offshore wind can move the water's edge a mile or more, leaving a milewide strip of soft mud to contend with. Along the coast of the Arctic Ocean there are never more than 6 weeks to 2 months of open water, and an on-shore wind can bring an icepack in against the shore at any time.

There is also the continuous game of tag with floating icebergs.

An on-site supply officer must compute the stocks he will have remaining on hand on the expected delivery date (weather and other factors permitting), determine total supply requirements for the whole year, and order the difference. An interesting paradox is that the supply officer never sees delivery of the goods he has requisitioned because he is rotated to another assignment before the resupply cycle is completed. Yet, the accuracy of his calculations is a major factor in the well-being and efficiency of the site.

### **Delivery Day**

After going through the "labor pains" of braving the elements, delivery day arrives and the "mother ship" stands as much as ten miles off-shore from the site scheduled to receive the supplies. The cargo is loaded into small, self-propelled barges which move the cargo to the beach for off-loading by commercial carrier personnel. The carrier assumes responsibility for everything necessary to move the cargo from the point of origin to the destination storage area. Station personnel working around the clock receive, unpack, and store the supplies in the limited storage space available at the site. When everything has been received and stored, planning begins for the next cycle in the never ending routine of annual re-supply of our remote installations. Through Operation "Mona Lisa" these activities are assured of the logistics support so vital to the maintenance of the "Top Cover for North America." □

# Enhancing the Effectiveness of AIR FORCE TACTICAL FORCES

By HAROLD BROWN

*Secretary of the Air Force*

## **Vietnam and Beyond**

Battle provides a rigorous test of whether the weapons we have developed and the forces we have trained are effective. The particular characteristics and limitations of current operations, however, keep them from being a complete validation of the planned composition of future U.S. forces. Deterrence of limited wars, and success in fighting them if they are forced upon us, are matters which must be evaluated repeatedly, using all relevant evidence. In fact, *avoidance* of battle while achieving national objectives would prove to be an equally valid and certainly a less costly test of weapon effectiveness. We face concurrently, then (1) a test of arms and purpose in Vietnam and (2) the need to incorporate relevant lessons of Vietnam into decisions, the effects of which will last beyond Vietnam, and which must be applicable to diverse political and geographical situations.

Past and projected improvements in United States Air Force tactical forces directly affect our success in both of these areas. Consequently, I am going to summarize first some improved combat capabilities stemming from the increased attention given Air Force tactical forces in recent years. Second, I want to point out two representative opportunities which will enhance even further the future effectiveness of tactical air forces. Briefly stated, our nonnuclear tactical airpower is highly effective now, and will get much better in the next few years.

## **Effects of Recent Improvements**

Air Force operational effectiveness in Southeast Asia has confirmed the wisdom of President Johnson and be-



fore him, President Kennedy, in strengthening our non-nuclear tactical capability. This improved capability—one measure is our present 24 tactical fighter wings as compared to 16 wings in 1961—has contributed greatly to U.S. dominance of the skies over Vietnam. Here we enjoy our greatest comparative advantage over the enemy.

Effects of U.S. air superiority in Southeast Asia have snowballed. In a complex and fluid battle situation the Air Force—along with Army, Navy, Marine, Vietnamese, and Australian air units all teamed with allied ground forces—has dramatically reduced North Vietnam's and the Viet Cong's earlier ability to easily concentrate forces and attack with surprise. Close air support and interdiction have taken a massive toll of the enemy's units, whether engaged, en route to battle, or resting in once secure areas. Airborne reconnaissance has robbed him of secrecy. Airlift has compressed the pipeline of vital supplies from the United States and has opened logistic support to otherwise isolated friendly forces and to the rebuilding effort necessary for Vietnamese economic development. Of particular importance, U.S. tactical air superiority has provided a relatively permissive environment within which the Army can employ helicopters to increase the mobility of its units. And with U.S. control of the air, our air and surface-borne supplies can be off-loaded after an 8,000-mile journey and distributed safe from harassment and destruction by enemy air.

These successes in combat, pacification, and nation-building stem initially from decisions made in the early Sixties to beef up U.S. tactical airpower. They reflect a

shift in emphasis away from an almost exclusive dependence on nuclear weapons, and a desire to possess alternatives beyond "humiliation or holocaust." Although the basic decisions were made nearly 6 years ago, modern tactical aircraft, trained crews, and their support cannot be created overnight, nor can ingrained attitudes be modified that fast. But incremental steps within the Air Force have been impressive, both in hardware and doctrinal adaptability. Here are some illustrations of those steps:

—In two major areas the Air Force has achieved a better balanced operational capability for its total tactical fighter force: (a) by greatly increasing training in nonnuclear operations for both aircrews and ground specialists, and (b) by an aggressive program of force modernization. We have moved to procure: (1) a long-range supersonic aircraft capable of penetrating sophisticated defenses, the F-111A; (2) a comparatively inexpensive attack aircraft for use in close support and in hitting surface targets in more permissive environments, the A-7D; and (3) a superior air-to-air combat aircraft, the F-4E. While each of these aircraft does particularly well in one mission, it also can perform effectively in one or more others. Furthermore, the total tactical force can deliver a wide variety of either nuclear or nonnuclear ordnance.

—Our tactical reconnaissance capability has been improved by introduction of the RF-4C, equipped with better sensors for night and bad weather operations. We are procuring the OV-10A, a new light armed reconnaissance aircraft which will increase the effectiveness of our forward air controllers in finding targets and controlling strikes. This aircraft will give the very important capability to mount immediate, though limited, attacks against fleeting targets.

—Since 1962, we have developed Special Air Warfare Forces, capable of assisting in nation-building and in countering insurgency.

—Some Tactical Air Command units have been restructured to improve advanced flying training, and to increase crew ratios and flying hours per aircraft. We have established within the Tactical Air Command a number of centers responsible for study and refinement of the operational concepts and tactics for tactical fighter, reconnaissance, airlift, and Special Air Warfare Forces.

—Our airlift has been more than doubled since 1961. By 1971, it will have 10 times the capacity of a decade earlier. We have materially reduced the cost of transshipments by interfacing strategic (intertheater) and tactical (intratheater) airlift as far forward as possible. An improved capability to operate assault transports from short, forward airstrips enables us to deliver cargo from the point of interface much closer to the combat area than was possible in the past. New methods have been developed for airdropping supplies to forward units where no landing strips are available.

—The Air Force and Army have improved their joint tactical teamwork. Both military departments, working in and with the Strike Command, have developed an impressive capability to move quickly from the continental United States to meet contingencies in any part of the world.

### **Future Improvements**

The improvements that I have outlined, and many others, represent past decisions which have altered our force structure and capability. Some of these decisions are products of experience and of lessons learned in Vietnam or, at the least, were strongly influenced by

*A Douglas C-133 is fueled from portable fuel bladders (in foreground).*





*These rubberized, air inflatable shelters have become a commonplace sight at Cam Ranh Bay Air Base, Republic of Vietnam. The igloo-like shelters, filling emergency warehouse requirements, are held up by a large air blower located at the rear of the building. Pressure inside the shelter is kept constant by completely sealing off the main compartment of the storage room.*

Southeast Asia experience. Others were decided in the very early 1960's. In a sense they are already history, but all of them are tied to the future. They give insights into the characteristics we would like in future tactical systems; their results provide empirical evidence which conditions the direction of research and development leading to future systems.

For example: (1) The demonstrated benefits of a well-balanced fighter force have quickened Air Force interest in a follow-on air superiority fighter, capable of defeating any projected enemy aircraft in air-to-air combat. (2) Experience in Vietnam has underscored the long-recognized importance of sustaining tactical air operations 24 hours a day in good weather or bad. Our improved night and bad weather operations lead us to look even harder for ways to locate and destroy targets that cannot be seen easily with the naked eye. The need to fly in all weather and at night has stimulated developmental work on navigation systems that enable our pilots to arrive at their targets very precisely under such conditions and while flying at high speeds. (3) Greatly improved reconnaissance sensors that are being used in our RF-4Cs have pointed up the necessity for quickly sorting the needles from the huge haystacks of information which such sensors can generate. (4) Current experience in Vietnam reconfirms that attrition can be reduced significantly by hitting a target on the first pass. Consequently, to lessen the exposure of our aircrews to hostile fire and to reduce the number of required sorties, we want to have extremely accurate ordnance. (5) The desirability of air-lifting supplies right to a combat area has long been recognized, from the point of view of both operational

effectiveness and economy. In Vietnam, we are constantly refining our techniques for forward delivery. We want assault transports with very short or even vertical takeoff and landing characteristics to advance this capability. (6) Finally, operations in Vietnam have again emphasized the need to control our powerful tactical force very closely in order to maximize its great flexibility and rapid responsiveness, and to avoid misuse. We want even better reliability, security, and versatility in our tactical command, control, and communications system.

I am confident that technology will be able to meet what we now see as future hardware needs. In fact, technology probably will be able to meet these needs in many ways. The more difficult problem is how to choose from a host of alternatives that will enable us to structure and equip our tactical forces for optimum operational effectiveness, and at the same time avoid using people improperly or acquiring excessive inventories of supplies and equipment that will become obsolete at a rather rapid rate. The stakes in terms of operational success and resource savings are extremely high.

Force level planning and selection of the most cost-effective hardware alternatives are two closely related areas in which the Air Force is concentrating a great deal of study. The commitment of forces is, of course, less intense in limited war than in general war. At the same time, calculations leading to the structure of forces for limited war are far more difficult than, say, computing what is needed to assure the destruction of a country which initiates general war against us. This is true because the variables in limited operations are far more numerous and complex.

The effects of tactical air operations in limited war are difficult to measure, especially the effects on a complex enemy supply network. Criteria for judging effects and picking target systems are particularly hard to come by. Factors such as sorties, tons of ordnance, and delivery accuracy can of course be analyzed to improve the efficient use of resources. However, because air-power effects must relate to national objectives, we are looking for ways to relate these measurable quantities to effects on other military operations and on the interactions of those operations with political factors. The Air Force, though since its beginning a leader in operational research, still has a long way to go in a relatively uncharted area. Nonetheless, I expect improving results from the increased effort and quality of our studies.

In determining our future force composition, a great many practical issues must be faced. Two of these, improved aircraft utilization and unit mobility, are among the most important. Obviously they have been thought about before. But under existing conditions, and wherever sustained nonnuclear operations are necessary, they are certain to be near the center of force structure debates. They offer good prospects for getting a great increase in combat capability from a relatively small investment. For this reason the Air Force is studying and testing new concepts for both utilization and mobility.

### **Aircraft Utilization**

Investment costs of high-performance fighters and their ground support equipment have grown rapidly. For example, during the Korean War the most effective MIG killer, the F-86F, cost \$211,000. Flyaway cost of one of its current counterparts, the F-4C, is about \$2,171,000. Consequently, we must examine the benefits and drawbacks of high utilization rates.

In the past, tactical units could surge for only a limited time; they then would begin to lose effectiveness due to limitations of parts and people. We are studying the practicality of generating high *sustained* rates of utilization. We want to know under what conditions it pays off. We have found it practical to get greatly increased use out of modern fighter aircraft through modest increases in air and ground crew ratios and spare parts inventories. Just *how* high utilization should go per aircraft (and per squadron or wing) is an important issue. It is not simply a case of seeing how many hours it is possible to fly an aircraft each day; at some rate (by definition this is the "margin of utility"), the cost of added hours per existing inventory aircraft eventually makes it more efficient



*Soldiers lay down aluminum planking for a landing strip.*

to buy additional airframes.

It should be pointed out that different limited war situations will generate different sortie rates. Under some circumstances it may be to our advantage to fly and maintain aircraft of the same squadron around the clock. But whether this makes sense often depends on the availability of worthwhile targets rather than the availability of extra crews and spares.

### **Improved Mobility**

A second opportunity for improved effectiveness of our tactical fighters lies in enhanced mobility, an absolute requirement for more effective deterrence or control of small wars. Composite Air Strike Forces of the Tactical Air Command have long been capable of deploying worldwide for either nuclear or nonnuclear combat. However, to improve the capability of all tactical forces for *sustained* nonnuclear combat, especially in areas having austere basing facilities, we believe that tactical units can be structured, equipped, and manned to allow deployment of a greater portion of the total force.

One of our mobility objectives is maximum freedom from reliance on elaborately equipped overseas bases with long runways. The comparatively short runway requirements for newer tactical aircraft like the F-111, F-4, and A-7 are a step in this direction. They reduce construction and logistic problems and accelerate

*(Continued on page 18)*

## OUT OF THE VAT AND INTO THE FIRE



**BEFORE**—Photo shows clogged trays, used to hold small parts for spray-painting, being cleaned by the old method in chemical vats.

Wire-mesh trays are used to hold small parts being spray-painted at the Lexington-Blue Grass Army Depot. As might be expected, the small holes of the wire-mesh eventually clog with paint. When this happens, the trays have to be cleaned. In the past, the trays were given a bath in chemical vats. However, this method proved expensive in chemical cost and man-hours required for upkeep. It also tied up chemical vats urgently needed for other purposes.

The Work Methods and Standards Section conducted a formal study supported by considerable informal brainstorming to find a faster and more economical



**AFTER**—Photo shows how Lexington-Blue Grass Army Depot saved \$13,450 last year by simply placing the trays in a metal frame and burning them clean.

method of cleaning the trays. Disposable trays were suggested and tried, but were unsatisfactory in terms of both cost and performance. Further study developed that the trays could be cleaned by mechanical, chemical, or burning methods. Costs were calculated for each method, and burning proved to be the quickest and most economical.

Now the clogged trays are placed in a metal frame and burned clean. The chemical vats have been released for other uses. By jumping from the vat into the fire Lexington-Blue Grass Army Depot saved over \$13,450. □

## WATER BLASTS HULL CLEANING EXPENSE

The Navy drydocks its ships periodically to remove fouling (sea growth) from the hulls by sandblasting. The hull surface is then primed and recoated with vinyl- and epoxy-type preservative paints.

While the sandblasting method is both quick and effective, much of the good undercoat and expensive preservative paint is blasted away along with the fouling. This increases processing time and calls for additional paint to repair the damage to the preservative finish.

Studying the problem fore and aft, Harland A. Morley, Master of Service Group Shops, Pearl Harbor Naval Shipyard, recommended waterblasting instead of

sandblasting. Waterblasting consists of squirting a small jet of water at pressures in excess of 5,000 pounds per square inch. The pressure-driven water effectively removes sea growth, loose paint and some light corrosion, but leaves sound vinyl and epoxy coatings intact. Sandblasting is reserved for spot processing of heavily corroded or badly damaged areas.

The idea was tested on the hull of the USS *TIRU* at Pearl Harbor and worked like a charm. Net savings from use of this method amounted to 21 cents per square foot or \$3,725 for the hull. Annual savings of \$147,000 are expected from continued use of the improved cleaning process. □

## REUTILIZATION OF ENGINEERING DATA



*Photo shows, at left, Mr. Robert L. Cartwright, contract negotiator, Aeronautical Systems Division, Wright-Patterson AFB discussing his \$300,000 cost savings idea with Mr. T. J. Hoke, Sr. cost reduction project officer in the C-141 Systems Program Office.*

Air Force contracting officers and engineers saved nearly \$300,000 by reusing developmental engineering data in the purchase of aerospace ground equipment. The engineering data had been designed for use in the fabrication of prototype items for automated air cargo terminals.

Normally, the whole package of engineering data including specifications and drawings must be completed, refined and adjusted before it can be used for fabrication of "production" type equipment.

In this instance, Air Force personnel at the Aeronautical Systems Division, Wright Patterson AFB, Ohio, determined after careful study that the data previously compiled for the prototype equipment were also adequate for defining the production equipment. Mr. Robert L. Cartwright, a contract negotiator in the C-141/Materials Handling System Program Office conducted the detailed survey. As a result of Cartwright's endeavors, over \$300,000, which was the estimated cost of refining the engineering data for production usage, was made available for the purchase of additional automated air cargo terminal hardware. □

### SECRETARIAL SERVICE AVAILABLE TO SUGGESTERS

During November (Suggestion Month), the Incentive Awards Office of Defense Personnel Support Center, Philadelphia (DPSC) offered a private secretarial service to any employee with ideas for improving services or saving money for the government.

A six-girl team was used to write out the ideas submitted by telephone, or in person, and then transpose them to a suggestion form. The form was returned to the suggester for prompt evaluation.

As a new means of obtaining ideas from the more than 7,000 Center members, two suggestions were offered:

"One: Remember your first day on the job? You asked questions about what and how to do it. If you thought you could do something a bit better, you kept it to yourself and did it the accustomed way. Pretend now you're back at your job for the first time and see the operations of your office through new eyes. Are those first-day ideas still good? If so, call them in. If not, try."

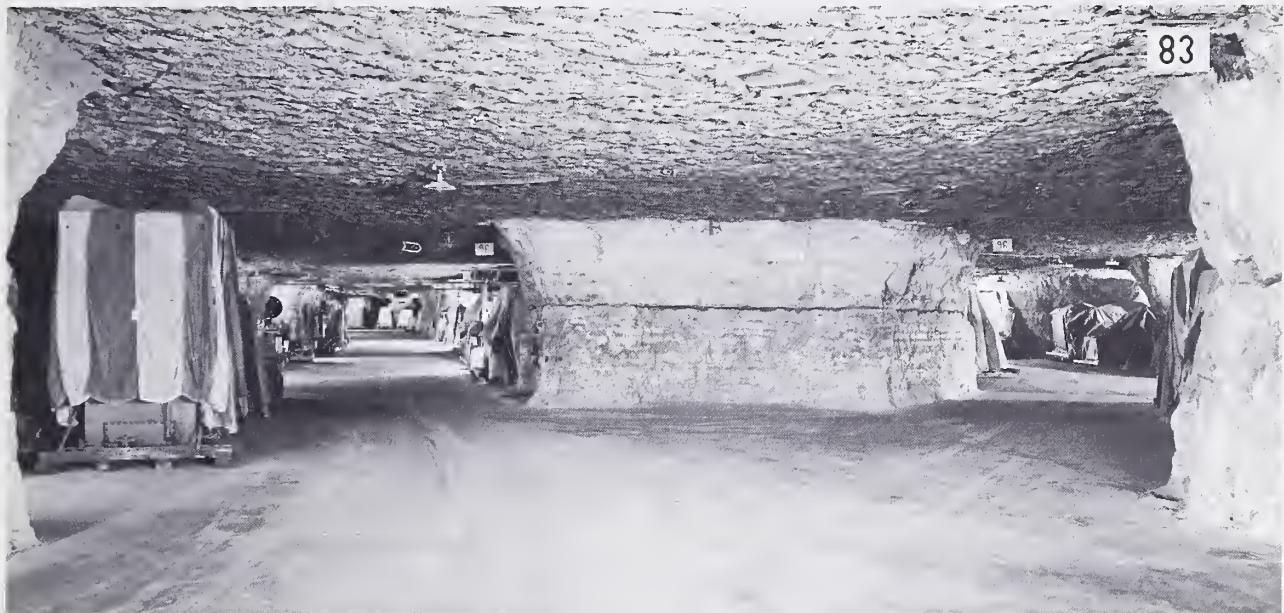
"Two: Imagine that today is your last day on the job and you've been asked, 'What would you do differently if you had it to do again?' That should start your mind popping. Once it does, dial those numbers and tell us." □

### GRAPHIC SUPPORT



Mr. David W. Dutch (at left, in photo) engineering draftsman, Defense Communications Agency, is shown as he was presented with a Cost Reduction Certificate in recognition of cost-savings accomplishments while an employee of the U.S. Army Strategic Communications Command (USASCC), Arlington, Va. The certificate recognizes a number of savings in the development and mass production of illustrations and graphics items, and also takes note of support given to the USASCC Cost Reduction Program through the preparation of various motivational posters. Mr. A. P. Lawo, administrative services officer, Defense Communications Agency, congratulates Mr. Dutch on his fine record of accomplishment. □

# DIPEC—A Source for Needed Industrial Plant Equipment



*Unique among DIPEC's storage, repair and rebuild sites is its contractor operated facility located in a labyrinth of limestone caves at Atchison, Kansas.*

## **Backs Up Military Mission**

The Defense Industrial Plant Equipment Center (DIPEC) at Memphis, Tennessee, is a vital source of assistance to Government agencies and Defense contractors in meeting military commitments, especially in times of emergency.

Since its establishment in 1963, DIPEC has continued to supply contractors with needed items of industrial plant equipment (IPE) which could not be purchased by industry in sufficient time or quantities to meet production requirements. The present Southeast Asia buildup is an example of how this type of help can be used advantageously.

The Center was established to achieve greater economy through redistribution of idle equipment. It is responsible for assuring that one DoD component does not procure a new item while another component has a similar item not being used. Although DIPEC's prime mission is to service DoD components, it also provides certain equipment by agreement to other Government agencies, such as the National Aeronautics and Space Administration and the Atomic Energy Commission.

## **Inventory Totals \$3.5 Billion**

At its Memphis headquarters, DIPEC holds either technical or operational control over six equipment storage and repair/rebuild sites from which equipment is shipped to users.

DIPEC now maintains records on a total inventory of some 331,000 items of equipment valued at about \$3.5 billion. This inventory encompasses items of metal working, electrical-electronic, test and general purpose industrial plant equipment used in the research, building, testing, and maintaining of weapon systems and other defense material.

Under a Defense Supply Agency Industrial Equipment Reserve (DSAIER) program, DIPEC manages an industrial plant equipment package reserve which consists of machine tools and other items needed to produce military end items not immediately available on the market. These packages are designed for producing items common to the Services, such as landing mats, concertina wire, steel helmets and liners, mess gear and kitchen equipment, tents and other basic equipment. Packages presently in reserve are valued in excess of

\$5 million, with another \$8 million worth now being brought into the program as a result of transfer of management responsibility from the Army to the Defense Supply Agency.

### Seeks High Reutilization

Since becoming fully operational DIPEC has shown its ability to support its customers through efficient reutilization of its assets. It is now screening an average of 3,150 requisitions a month against its idle inventory.

In FY 1966, DIPEC effected reutilization of more than 12,000 items of equipment valued at more than \$156 million.

DIPEC's contributions to economy and the military effort have been noteworthy. Some examples of savings to the Government are:

—Four 1,000-ton mechanical presses were furnished the Army's Ammunition Procurement and Supply Agency, Joliet, Ill. The acquisition cost of these items totaled more than \$500,000.

—Three 1,600-ton mechanical presses for use on the Bomb Demolition M-117 program, with a total acquisition cost of \$556,650, were also provided for the Army.

—An impact hammer with an acquisition cost of \$165,090 was shipped to the Bell Helicopter Co. in Fort Worth, Tex., for use in the Army's UH-1 helicopter production program.

—A milling machine, which originally cost the Government \$167,712, was supplied to the Martin-Marietta Co. of Baltimore, Md., for use in an Air Force production program.

—A boring and turning machine, declared idle at the

General Electric Co., at Burlington, Vt., was moved to the Philadelphia Naval Shipyard to replace an older machine. Acquisition price of the idle machine was \$126,025.

### Develops Standards

In the midst of these achievements, DIPEC continued the difficult and time-consuming task of developing standards for describing industrial plant equipment. Commonly understood terms permit the cross servicing of equipment (which hitherto was often blocked by terminology familiar enough to one agency but obscure to another) and provide for a more efficient utilization of electronic data processing.

DIPEC has also been involved in developing a sub-classification coding system within the Federal Supply Classification (FSC), known as PEC's, or Plant Equipment Codes. The PEC's not only embody the FSC but identify type, size, capacity and other characteristics of the item.

DIPEC develops, publishes and maintains IPE handbooks that include the production equipment code cross referenced to the PEC, item description by manufacturer, and guides for preparing descriptions of IPE.

Publication of all handbooks covering the entire DIPEC scope of 88 FSC's is scheduled for completion by November 1966. These will provide more than 100,000 individual identifications by manufacturer's part/model number and will specifically identify items of in-use and idle IPE to be reported to DIPEC or to be screened by DIPEC prior to procurement. These handbooks will greatly facilitate management of IPE throughout the DoD.

*One of DIPEC's machine shops at the Atchison, Kansas, cave complex is located above ground where defense-owned industrial plant equipment is repaired and placed in a ready-for-use status.*





**From its headquarters at Memphis, DIPEC has technical and/or operational responsibility for four sites to store, preserve, repair and rebuild defense-owned idle industrial plant equipment. Strategically located across the country according to density of major U.S. industry, these sites include a contractor operated facility at Atchison, Kansas, and government owned and operated facilities at DSA depots including Mechanicsburg, Pa., Columbus, Ohio and Tracy, Calif. Above is a typical storage area at the Tracy facility.**

### **Manages National Industrial Equipment Reserve**

As a part of its responsibility to maintain a balanced reserve of IPE, DIPEC manages the National Industrial Equipment Reserve (NIER) program under Public Law 883. This provides for a national reserve which may be loaned, leased, or transferred to other Government agencies, nonprofit educational institutions, or training schools, and may be used by private industry in the event of emergency. In recent years, considerable emphasis has been given to loaning NIER equipment to vocational training schools.

The first loan of NIER equipment to a school was authorized in late 1958 and since that time interest in the program has grown to considerable proportions.

**This stretch press, used in forming metal for aircraft and other U.S. weapons, is one of the 350,000 items of costly equipment in DIPEC's centralized inventory.**



Requests have been received from almost every State, including Hawaii. Through December 31, 1965, there were 141 loans to schools and two to Job Corps camps. These loans covered 3,917 items of equipment valued at about \$16,374,000.

Approval of these loans does not affect the DoD surplus property program under which educational institutions and training schools may acquire surplus tools as they become available.

Some of the more far-reaching benefits expected to accrue from this facet of the NIER program are:

—A reserve of skilled labor of unlimited value in the event of mobilization.

—The retention of a reserve of Government-owned machinery on a dispersed basis.

—A saving to the Government of processing, storage, and maintenance costs of the loaned equipment.

### **Many Programs Benefit**

Among Federal agencies benefiting from DIPEC's program is the U.S. Treasury Department. A total of 61 items valued at more than \$642,000 has been made available to assist in relieving the coin shortage. DoD-owned presses on loan to U.S. mints provided the addi-

tional capacity to increase FY 1965 production to eight billion coins. The total FY 1964 production was 4.3 billion.

Through an agreement between the Defense Supply Agency and the Federal Aviation Agency (FAA), FAA contractors are obtaining loans of idle DoD industrial plant equipment for use on the Supersonic Transport (SST) Development Program. FAA is authorizing two airframe and two engine contractors to screen the DIPEC idle reserve for equipment to aid in improving design and for building full-scale models of the SST.

Defense contractors also are saving dollars for the Government by using idle IPE. A Massachusetts firm needed two grinding machines for use on military engine production programs. DIPEC made the machines available from its Terre Haute, Ind., storage facility.

In another case, a New York company required an

all-weather chamber as part of a vibration test facility called for in the manufacturer's contract. DIPEC directed shipment of the chamber, which was in process of being placed in idle storage, thus saving the Government at least \$218,530.

A furnace, required by a contractor at Hartford, Conn., had been declared idle and marked by DIPEC for shipment to one of its storage sites. In cooperation with the Bureau of Naval Weapons, DIPEC returned the furnace to active use to increase production of aircraft engines at the Connecticut plant.

In a variety of ways, DIPEC is continuing to aid the Nation's defense effort and save the taxpayer's money by its efficient reutilization of equipment. In addition, it is providing the buildup of a reserve of skilled personnel through its loan of equipment to vocational training schools. □

#### *ENHANCING THE EFFECTIVENESS (from page 12)*

deployment of tactical forces by enabling us to use a great many short fields that exist throughout the world. A longer term objective is the development of V/STOL tactical aircraft that can operate from semiprepared strips or pads.

As we reduce our dependence on hard runways, we must also reduce reliance on elaborate fixed operating facilities and be prepared to operate effectively from bare or austere equipped bases. Here we are seeking imaginative ways to eliminate nonproductive weight and bulk from the portable equipment and shelters that must be deployed to sustain operations. For instance, we are fabricating a portable fuel storage and distribution system that will give triple the discharge rate of the present system, provide half again as much storage capacity, cut weight by 7000 pounds, and be transportable in one rather than two C-130 aircraft. A promising portable lighting system weighing less than 8,000 pounds would provide effective runway lighting, including approach strobe lights. The present system weighs 19,000 pounds.

Of course, global airlift is a principal factor in our present and future ability to move rapidly into a relatively primitive environment and sustain operations. As I have already pointed out, we are making rapid progress in expanding our airlift capability.

Since squadrons rather than wings are often the units deployed to deter or control small scale non-nuclear conflict, it may be necessary to decentralize some of the maintenance and other specialized work now done at wing level. This organizational concept is being tested. In general, the fewer ad hoc support

arrangements that are necessary, the more quickly a unit can deploy and be ready to operate.

As with the returns from increased utilization of high cost aircraft, the benefits of increased mobility appear to be great from a modest investment. Our current estimate is that for less than 9 million additional dollars we could equip a fighter wing to deploy quickly to a bare base for sustained nonnuclear operations. This is apart from any costs incident to support whatever higher aircraft utilization rates are decided on. Having accomplished its mission, the wing could recover its bare base equipment and take it along for future use—everything from collapsible hangars and barracks to portable airfield control facilities.

Our tactical air successes in Southeast Asia, and the opportunities for further enhancing the effectiveness of Air Force tactical forces, illustrate part of a continuing search for means to discourage aggression. They emphasize sustained nonnuclear means and are an important part of a total deterrent capability. The upper limits of that deterrent power—U.S. strategic retaliatory forces—have discouraged potential aggressors from waging or threatening to wage nuclear war against the United States and its principal allies. The task of providing still further discouragement to aggressors in Vietnam, and to their potential imitators elsewhere, rests now in large measure on the present success and projected effectiveness of the Free World's nonnuclear forces—land, sea, and air. We hope, as events unfold, that the effectiveness of such forces will prove great enough to deter limited aggression as effectively as our strategic retaliatory forces have deterred general war. □

# A COST-CONSCIOUS WORK FORCE

By JOHN W. MACY, JR.

*Chairman, U.S. Civil Service Commission*

What is the role of the civilian employee in the Department of Defense Cost Reduction Program? This is a question I have been asked as Chairman of the U.S. Civil Service Commission.

In considering the question, my thoughts immediately focus on the vast human resources involved in the critical business of safeguarding our national security:

- Over 1 million civilian employees
- Over 2 billion civilian man-hours expended annually

In brief, my reply to the question is that the civilian work force should be *invited*:

—to apply the power of a million minds to finding ways to economize at a million work sites; and

—to generate a maximum amount of enthusiasm for carrying out day-to-day economies in the 2 billion man-hours they collectively invest in their work each year.

You will note that I have emphasized the word "invited" in the paragraph above. The word "assign" might be the first one to come to the minds of those of us in the management ranks whose day-to-day decisions are concerned with assigning resources of money, material, and manpower to various programs. But "assign" does not convey the factors of motivation, stimulation, and encouragement that are needed if we are to gain the very best cost reduction results from our human resources. Instead, we want to *invite* each employee to search aggressively for operational economies. We want to *challenge* each employee to exert maximum economy in his day-to-day use of supplies, equipment, manpower, etc. We want to *inspire* each employee to be alert to the dollar and cents aspects of his job and his organization.

How does this all relate to the role of management in cost reduction? First of all, it is a basic responsibility of management to search for cost reduction. This is an inherent part of the job.



The manager, with the aid of his top staff such as the comptroller, the director of management, the cost reduction coordinator, the management analysts, the personnel director, the value engineers, etc., is concerned with the big picture of cost reduction. In the search for economy he will be reviewing entire programs to determine whether they should be maintained, revised, or eliminated. He will be reviewing organizational structure and alignment to discover ways to improve cost reduction. He will ask for special management studies to identify new streamlined methods. He will be looking for techniques to save money on contracts. He will be looking for new equipment or technological advances that will increase efficiency. Obviously, the manager and his top staff will account for a significant proportion of the cost reduction results of an organization. In military terms, he is dealing with the overall strategy of achieving cost reduction goals.

On the other hand, civilian employees and their immediate supervisors are in a position to identify and recommend the tactical strategy—the improvements in operations at the work site that will aid in the total economy effort. They can serve as the necessary outposts—the lookouts and the patrols—that pinpoint where the enemy (waste and inefficiency) is located and recommend the tactical steps that need to be taken on many fronts in order to gain full victory in the war on waste. These are the local battlefield improvements that the men and women on the job can develop that would not otherwise come to the attention of the commander or other top

people who are conducting the overall strategy. While these local improvements are usually not dramatic or sweeping, they do add up in large organizations to thousands of dollars annually and have the additional value of maintaining and strengthening the cost-conscious climate for the whole work force.

### **What Are Employees Currently Doing in Cost Reduction?**

Cost reduction achievements are generally beyond the normal scope of job requirements for the majority of civilian employees, and consequently are eligible for consideration under the employee awards program. Therefore, the statistics of the awards program provide an indicator of the level of employee involvement in the cost reduction effort. The award program statistics for the Department of Defense for FY 1966 show:

Total Employee Suggestions Submitted-----	275, 342
Total Employee Suggestions Adopted-----	71, 630
Number with Measurable Benefits-----	24, 953
Value of Measurable Benefits-----	\$106, 151, 697
Superior Job Achievements with Measurable Benefits-----	602
Value of Measurable Benefits-----	\$105, 955, 950

These statistics show that approximately one out of every four Defense civilian employees was motivated to submit an idea for improvement in FY 1966. During the year, 26% of the total ideas were adopted and 9% of the total ideas had some type of cost reduction payoff. This is certainly a commendable record.

Combining awards for suggestions with awards for special achievements, the statistics indicate that:

—25,555 civilian employees received awards for economy achievement.

—\$212,107,647 in measurable benefits were reported from the first-year application of these achievements.

Translating these statistics, we could say that almost one-quarter billion dollars of economies were produced in FY 1966 as a result of the ideas and special achieve-

ments of 2.2% of the civilian personnel complement.

This is the best record in Government.

### **Is There Room For Improvement?**

The Department of Defense has ample reason to be proud of the record of employee contributions to economy, but at the same time all segments of the Department will be looking for additional improvement. Some data on outstanding industrial programs indicate that a further upward trend may be feasible.

The Maytag Company, a manufacturer of washing machines, has a working complement of 1,785. Last year, 1,696 of these employees, or 95% of the work force, submitted a cost reduction idea. Even more significant, 75% of these ideas were adopted and received cash awards! This record is exceptionally outstanding and is based on a long tradition of employee interest in cost reduction plus a great deal of attention to training employees in work improvement techniques. Admittedly, this is an unusually high degree of employee participation and not typical of large organizations.

But some of our largest private corporations such as General Motors, IBM, and General Electric do have records that are of interest. The latest data for these companies is shown in the table below.

These results in private industry did not occur as a result of overnight effort or a one-time promotional campaign. They are the consequence of continued long-term efforts to build up employee confidence that their ideas are wanted; that they will receive fair evaluation; that they are sincerely appreciated; and that they are given meaningful recognition.

### **Increasing Receptivity to Change**

In any organization—and particularly in an organization as large and complex as Defense—there is an

	Total suggestion awards per 100 employees	Percent of employees receiving awards for cost reduction ideas (*)	Total paid in awards	Average award
General Motors . . . . .	41 per 100	12. 0	\$9, 208, 437	\$47. 55
IBM. . . . .	31 per 100	9. 0	1, 771, 910	75. 09
General Electric. . . . .	35 per 100	10. 0	921, 048	29. 45
Department of Defense . . . . .	7 per 100	2. 2	2, 880, 761	49. 00

\*Based on conservative assumption that 30% of cases have measurable savings.

inherent problem of how to facilitate innovative change or economies at the middle organizational levels. Most organizations have this problem—and the reason is not complex. It is at the middle levels where potential change most often requires a great deal of implementation. At the same time, the responsible people at these levels are heavily involved in carrying out day-to-day operating responsibilities. Still further, it is at these levels where the motivation to make changes is probably weakest because of individuals being committed to procedures they themselves have designed, or because of individuals who fear the loss of personal status that might stem from change.

Let me illustrate some of these blocks to innovation. An idea for a change in methods flows up through supervisory channels with approving comments until it gets to an evaluating individual on the management staff. He reviews the idea, and subconsciously perhaps, says to himself "Holy catfish—if we adopt that idea, the whole system I designed last spring will have to be changed." This naturally gets the idea off on the wrong foot with this evaluator. He studies the idea a little longer and says to himself, "If we accept this proposal, I'll have to rewrite three chapters in the Procedures Manual—and I'm already 3 months behind on top priority projects."

Most ideas have some disadvantages as well as advantages. Is it surprising that the evaluator in this example might be inclined to give more weight to the disadvantages? I haven't even mentioned still another factor: as he looks the idea over and sees the workload he has to assume to make it a success, he realizes that the originator of the idea will get the credit, while he, the evaluator, works overtime to do the necessary rewrite on the Procedures Manual.

Often the evaluator at the middle levels can only say "no." He does not have authority to say "yes." If he is inclined to recommend approval, he also has to prepare a memo analyzing the pros and cons in depth, illustrating the procedural changes, and most important, placing his reputation on the line in support of the feasibility of the proposal. This requires that the evaluator have a strong interest and a positive commitment toward making changes. Some evaluators don't meet the test.

Or let's take another case where the evaluator sees that he would have to ask for approval from a higher level. He thinks about some other requests that are currently pending up at the higher level, including his own personal projects, and decides this additional request might be an irritant that would interfere with the other cases. So he "reasons" that the disadvantages of

the new proposal outweigh the improvements involved—another potentially useful idea shot down.

I could go on with additional amplifications—but I believe the point is made. The question is what can be done to minimize these human deterrents to innovation?

First, we should look for some effective ways to provide positive motivation for middle-level evaluators to welcome changes. One of the most effective techniques is for management to make clear by its decisions that an individual's commitment and receptivity to constructive innovation are factors taken into account in promotions. This is a meaningful technique. Since its use depends on the frequency of promotional opportunities and also on some of the other qualifications of candidates, this technique needs to be supplemented with others.

Some of the less formal techniques can be applied widely. For example, the evaluator who said "yes" on an important innovation can be mentioned when the cost reduction achievement is written up in the local house organ. The commanding officer or manager can make gracious use of oral commendations at staff conferences.

On a more formal basis, an evaluator who has *consistently* done a superior job should be considered for an award or a special quality pay increase. In addition to motivational factors, some use might be made of the control techniques by setting up a requirement that all proposals or suggestions having a potential value greater than "X" dollars will be reviewed by the Director of Management or the Executive Officer before they are rejected.

Any steps that can be taken to increase the organization's total receptivity to constructive change will strengthen the motivation of the civilian work force toward taking an active role in the cost reduction program.

### ***Motivation, Recognition, and Awards***

Employees of DoD are motivated by a wide variety of factors. For some, the prime motivator is the dedication to serving the troops on the front lines; top management in Defense and citizens throughout the country are grateful for this dedication. For others, the prime motives may include factors mentioned by behavioral scientists, such as:

- the motivation for distinctive achievement,
- the motivation toward important work and responsibilities,
- the motivation for growth and advancement,
- the motivation for esteem,

—the motivation for fulfillment of one's highest abilities,

—the motivation to receive recognition when it has been earned.

Those people near the top of the organizational hierarchy quite often find sufficient satisfaction in the first five items due to the nature of their jobs. But the vast bulk of the civilian work force, because of their lesser responsibilities, their fewer opportunities for high achievement, and their lesser degree of career advancement, are quite concerned with the sixth item. In short, they do want to receive special credit for the things they do that are beyond the contributions of their peers.

The incentive awards legislation was originated and approved by the Congress so Federal managers could grant cash or honorary awards to meet these needs for special recognition wherever it has been earned. Honorary awards are generally reserved for the highest type of achievement, and they are made meaningful to the recipients by the fact that very few are presented. The cash award is generally used to provide the broader-base award that a much larger number of employees may aspire to. It is this type of award that has a readily accepted meaning and value for most employees.

### **Use the Awards Program to Support Cost Reduction Activity**

The operations of the awards program can and should be called on to provide support for the objectives of the Department's cost reduction program.

The operations of the program can be used as a communications channel to all employees—to remind them periodically of the organization's cost reduction goals and ask for their continuing help, to inform them of management's top-level cost reduction projects and invite their ideas, and to give them tips and hints on searching for cost reduction possibilities in areas of particular concern to management. Some of this is being done at some Defense establishments, but there is room for more of it.

On a more specialized basis, there may be particular value engineering projects on which it might be useful to invite suggestions from employees in the organizational segment familiar with the item being studied. In the Zero Defects field, an employee who submits an idea that eliminates the causes of an error should be considered for a suggestion award.

The program can and should be used to grant awards to employees when their cost reduction proposals or achievements have gone beyond the normal requirements of their jobs. This can mean an adopted

suggestion which goes beyond the kinds of ideas the supervisor habitually requires as part of regular performance. Or it can mean an achievement which is in line with job requirements but so superior in value that it deserves special recognition. The awards program has been used a great deal for these purposes but there is opportunity for further application.

The economy achievements of civilian employees that originate within channels of the awards program should be furnished to the cost reduction officer for his use in making his periodic reports. Also, the economy achievements of civilian employees that arise in cost reduction channels should be fed into the awards program for appropriate recognition when they are beyond actual job requirements, or when they are superior job achievements.

The dramatization of individual economy achievements through the operations of the awards program at the local level can serve as a vivid illustration of local management's deep interest in maximum cost reduction activities and can serve to build up and sustain the widest possible employee interest and participation.

The way in which the awards program can support cost reduction activities can be personalized by the

*Mr. Donald C. Akana, an employee of Pearl Harbor Naval Shipyard, has received over \$800 in awards for numerous beneficial suggestions.*



story of Donald Akana, electronics mechanic at Pearl Harbor Naval Shipyard. When Mr. Akana received his 10th suggestion award for an achievement which saved \$4,832 annually, he was given headline treatment in the shipyard newspaper. When Mr. Akana only a few weeks later received another award of \$475 for an economy idea valued at \$9,465, he was interviewed and asked his formula for success and quoted in the newspaper as saying: "Concentrate on your everyday work—because that is the area that you know better than anyone else." The shipyard management then decided his talents should be used full time on cost reduction, and he was detailed to the Shipyard's Cost Reduction Office as assistant deputy coordinator for all production shops.

By concentrating on the area he knew best, Donald Akana succeeded in saving the Government thousands of dollars. There are other Donalds and other ideas for cutting costs waiting to be discovered. The Department of Defense Cost Reduction Program, backed up by a vigorous awards program, can direct the fire of a million minds and put it to work for the good of the Nation.

In these days of uncertainty and challenge to our national security, a cost-conscious civilian work force stands shoulder to shoulder with the military in defense of our ideals. It is up to civilian managers to see that the achievements and suggestions of our "civilian soldiers" in DoD are encouraged and given appropriate recognition. □

### AIR FORCE HOLDS THIRD ANNUAL COST REDUCTION AWARDS CEREMONY

Randolph AFB, Texas, hosted the U.S. Air Force's Third Annual Cost Reduction Awards Ceremony on October 26. The ceremony honored 12 military and civilian employees whose individual cost reduction accomplishments had been selected as representative of the many thousands of significant savings actions reported by the Air Force during FY 1966. Fifteen other employees received awards for outstanding management of the Cost Reduction Program during the year. Notables present for the occasion from Headquarters USAF included the Honorable Norman S. Paul, Under Secretary of the Air Force, and General Bruce K. Holloway, Vice Chief of Staff, USAF.

Among the individual awardees was MSgt James C. Sorrells, Jr., from the Military Airlift Command, shown at right receiving an Outstanding Individual Action award from General Bruce K. Holloway, Vice Chief of Staff, USAF. MSgt. Sorrells, a Deficiency Analysis Technician with the 63d Field Maintenance Squadron, Hunter AFB, Military Airlift Command, received his award for the following action: "A requirement existed for a special generator wrench to be used for removal and replacement of C-124 generators in-flight, or on-base when enroute maintenance is not possible. The type of wrench required cost \$10.25 each. Plans called for a wrench to be issued to each flight engineer. MSgt. Sorrells searched available sources and found



*MSgt. James C. Sorrells, Jr. receiving cost reduction award from General Bruce K. Holloway, Vice Chief of Staff, USAF.*

that a wrench costing \$4.74 each could be used in lieu of the more expensive wrench. He also reasoned that total requirements could be reduced by 207 wrenches if wrenches were issued on the basis of one per aircraft instead of one per flight engineer. These changes saved the Air Force \$2,347 in FY 1966." □

### GUAM TAKES THE STING OUT OF MOSQUITO CONTROL COSTS

Public Works Center personnel on Guam are responsible for mosquito control in the swamp areas near the Naval Station's laundry and commissary facilities. Mosquito control on Guam has special significance be-

cause of the ever present dangers from encephalitis, dengue fever and malaria.

Previously the Public Works crew waded throughout the area, eight abreast, hand casting a pelletized insecti-



**BEFORE**—Photo shows two of the eight Navy employees from the Public Works Center, Guam, previously required twice-monthly to manually distribute insecticides for mosquito control.

cide. This treatment was required twice monthly, and each application consumed approximately 4 hours of working time.

Mr. Herbert DeLima, Quartermaster, Grounds Maintenance Branch, PWC, Guam, found a way to reduce the manpower required from the eight-man crew to one individual by use of a back-packed portable power sprayer. The mechanized sprayer dispenses liquid insecticide from the swamp perimeter in 2 hours per treatment.

This new technique has reduced the cost of mosquito control in this area by \$2,818 per year. □



**AFTER**—One PWC employee equipped with a portable power sprayer accomplishes the mosquito control work previously performed by the eight employees.

## RECIPE FOR SAVINGS

Take a few manufacturers of foot powder, add a can company trying to make a better container for spices, blend in an imaginative Government packaging expert, season with a pinch of persistence, and serve up a generous helping of more than \$111,000 in savings.

This unique recipe for cost reduction began to jell about 2 years ago when companies supplying foot powder to the Armed Forces under contract with the Defense Personnel Support Center, Philadelphia, Pa., complained that the round, shaker-top cans previously used for the powder were not available from commercial sources. The manufacturers asked if they could use a commercial-type container.

VE packaging expert Louis Ludas was assigned to find a suitable container. Five of Ludas' 25 years in Government service were in the medical packaging field. Consequently, he was familiar with the products offered by can companies.

Can companies quickly responded to Ludas' request for samples. The most promising sample was a small, rectangular-shaped can used to package pepper and

other spices. Ludas had the can tested but found it could not be satisfactorily reclosed. The search might have ended there except that Ludas asked the canmakers to keep after the problem.

Last year, with the mounting supply requirements for Vietnam, the need for an improved foot-powder dispenser increased. Ludas, still in touch with canmakers, received a sample of a new spice can with a plastic reclosable top. Ludas tested the can which quickly passed muster. Since the can is in wide use in the spice industry, large quantities were available. Ludas and the Center received an added bonus because the spice can costs about 2 cents less than the old round can.

Since the Center adopted the spice can for foot powder, its procurements of almost 6 million cans have yielded savings of \$111,667, with an additional \$20,000 expected shortly.

The Defense Personnel Support Center, a field activity of the Defense Supply Agency, procures food, clothing, and medical items for the Armed Forces. □

## OSCILLOGRAPHERS TAKE NOTE—HALF A PAGE IS GOOD ENOUGH

One of the important devices used at Picatinny Arsenal, U.S. Army Missile Command, to record data obtained from ammunition tests is the oscillograph. This machine provides a permanent record of such measurements as thrust, pressure acceleration, temperature strain, etc., all of which are vital factors in munitions testing.

The standard 12-inch oscillograph is generally used for this purpose because it provides a high-time resolution for more accurate reading on the graph paper. While the quick response provided by the 12-inch model is essential, 90 percent of the test data recorded covers only the first 6 inches of the graph paper.

Aware of this fact, Mr. Carmelo T. Garfi, an electronic technician in the Arsenal's Technical Services Laboratory, reasoned that the cost of the 400 feet of graph paper used per day could be reduced nearly 50% if a way could be found to convert the machine to accept the smaller width paper. Taking up the challenge, Mr. Garfi explored various possibilities and found that by fabricating spacers for the feed and take-up rollers, and installing a special guide on the transport table, the oscillograph would accept the 6-inch paper. Result—the new method worked as smoothly as the old.

Savings gained through Mr. Garfi's suggestion will amount to \$5,620 annually through use of the less



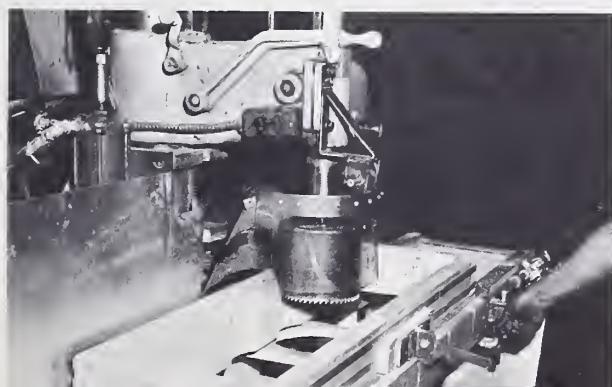
*Carmelo Garfi, left, shows Stephen Smith of the Picatinny Arsenal staff how he modified oscillographs to accept graph paper only half as wide as the standard 12-inch roll, with resultant savings of \$5,620 annually.*

expensive paper. Additionally, there are other savings which will result from his idea. These include, doubling the life of the processing chemicals, reducing by one-half the man-hours needed to clean the processor and mix the chemicals, and a possible reduction in machine maintenance costs because of the lighter transport load. □

## DISCOTRIQUE

Louis Hodgson, a Saw Reconditioner in the Box and Crate Division, Sierra Army Depot (Herlong, California) does not claim to be any great shakes at doing the twist, but when it comes to doing a jig for cutting circles he is in there with the best of them.

*Photo below shows a disc-cutter and special jig developed by Mr. Louis Hodgson which helped eliminate a bottle-neck at Sierra Army Depot in the production of pallets for holding propelling charges. Mr. Hodgson's method of producing contour dividers for the pallets reduced pallet production time from 2 hours 10 minutes to 39 minutes per pallet.*



Stepped-up production of special pallets for shipping propellant charges overseas had the Depot's box factory in a whirl. Semicircular cuts had to be made on the contour dividers that hold the propellant charges in place in the pallet. Band saws were tried but consumed 2 hours and 10 minutes per pallet. Catalogs were searched for cutters without success. Estimates obtained from lumber and milling firms did not meet the urgent time requirements.

Working with scrap metal from the machine shop, Mr. Hodgson fabricated a disc cutter that proved a hit. The new cutter and a special jig (see photo) permitted two semicircular cuts with one stroke. These devices reduced production time for each pallet to 39 minutes, a saving of 91 minutes over the previous method.

The box factory increased its tempo and the production schedules for the special pallets were met. Mr. Hodgson's "disc-o-trique" already has produced savings to the tune of \$21,181 for Sierra Army Depot, and greater savings are expected. □

# HOW MUCH WILL IT COST?

By

DR. ERNEST J. JOSS

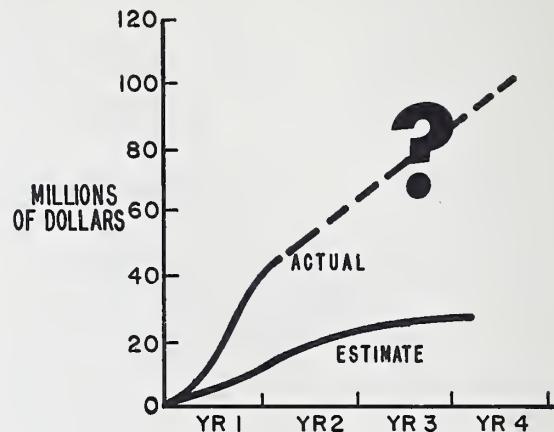
Professor of Engineering Research  
Pennsylvania State University

DR. J. STERLING LIVINGSTON

Managing Partner  
Peat, Marwick, Livingston & Co.

JOHN A. WANDER

Manager  
Peat, Marwick, Livingston & Co.



Not an easy question to answer when it pertains to defense hardware procurement. "If we could foresee the eventual cost growth of many defense hardware weapon systems, we'd never initiate them . . ." This statement was made recently by the project manager of a major missile program now several years into development and production. The project manager's dilemma is not an isolated case, verified by the fact that in July 1964, the Department of Defense, by Directive, placed specific emphasis on the improvement of cost estimating and contractor cost and performance reporting techniques for major hardware procurements. This emphasis has, in turn, required the special attention of industrial managers toward developing improved methods of estimating, controlling, and reporting hardware costs.

There are several major difficulties in effectively pricing defense hardware. One of these difficulties is the weakness inherent in estimating unknowns. Often the data available for analysis of contractor proposals is not sufficiently detailed to allow meaningful comparison with data obtained from past procurements. Also, the business climate of the competing contractors at that particular time and the general economic outlook tend to influence the estimating accuracy.

A second major difficulty in procurement pricing—and the problem toward which this article is directed—is the lack of accurate and timely data reflecting actual hardware costs and performance, both during and after manufacture. When major items of equipment are being manufactured, substantial costs are incurred by contractors prior to delivery of the hardware. Although periodic reports of contractor manufacturing

costs are available by functional organizations (i.e., engineering, manufacturing, support, etc.), the direct relationship of costs to hardware items is rarely established during manufacture. Two basic reasons for this are the magnitude of the "work-in-process" expenditures and the fact the costs reported by contractors have often been prorated, distributed, and redistributed, causing considerable difficulty in sorting actual hardware costs from the summary of organizational costs.

Another complicating factor is that actual hardware manufacturing costs and the contractors' collection and reporting of these costs must be planned around and reflect the repetitive cycle of the natural procurement/fabrication/assembly/test sequence—reflected by a manufacturing-oriented time-phased hardware family tree diagram—while program proposals, contracts, and program plans are—and should be—initially directed toward the definition/design/functional activity sequence—reflected by a systems engineering-oriented functional work breakdown structure. Further analytical confusion often occurs when program cost reports involve a prime contractor with separate operating divisions and one or more subcontractors, whose accounting and reporting systems are based on variations of actual job cost and standard cost systems.

The recent trend toward using the firm fixed-price and fixed-price incentive type contracts and the practice of total package contracting for both the development and production of weapon system hardware have placed increasing importance on the Government's ability to evaluate estimates and to monitor contractor performance. Many defense managers oppose the reporting of actual cost details to the Defense Department or Mili-

tary Service Program Offices under such contracts, maintaining that use of firm fixed-price and fixed-price incentive contracting reduces the need for much documentation of expended contractor funds. While this position may be valid for some contracting conditions, Government program managers held responsible for justifying the expenditure of substantial funds would not necessarily agree.

### **Series of DoD Top-Level Actions**

In support of the program manager's position and in recognition of the need for standard contractor historical cost data, Cyrus Vance, Deputy Secretary of Defense, by DoD Directive 7000.1 and DoD Instruction 7041.2, established the requirement for a "Cost and Economic Information System" (CEIS) to be used for "the collection and analysis of actual and estimated cost and related information pertaining to the acquisition of weapons systems and major items of equipment."

During October 1965, the Office of the Comptroller distributed a letter initiating activities toward the development of an integrated management control and information system for capital acquisition programs, called "Selected Acquisitions Information and Management System" (SAIMS). The prime SAIMS objective was to provide more effective management control of Defense acquisition programs. The letter established a reconnaissance group, chaired by Colonel Herbert Waldman, Office of the Secretary of Defense, Comptroller's Office, and composed of representatives of the Services, the Department of Defense Research and Engineering, and the Office of Assistant Secretary of Defense (Installations and Logistics). The group was assigned the task of recommending whether a "new start" should be made by the DoD toward development of a performance measurement system, or whether (and much preferred) the system should employ existing management reporting procedures or those currently being developed and tested by the Services.

A recent SAIMS working group report, summarizing findings of a survey of contractor reporting systems planned or implemented on 13 current major weapon programs, resulted in a general recommendation for use of a specification approach to integrating currently existing subsystems into uniform performance reporting systems. Results of these DoD studies are reflected in a letter written to Defense contractors from the Office of the Assistant Secretary of Defense, by George W. Bergquist on August 9, 1966. Through this letter, the Office of the Secretary of Defense invited industry to comment on a proposed specification en-

titled "Schedule and Cost Planning and Control System Specification for Contract Management." This specification reflects a part of the current Defense Department plans for the eventual development of a uniform contractor reporting system for cost, schedule, and technical performance. Hopefully, this approach will deter the further proliferation of reporting systems for cost, schedule, and technical performance.

### **The Production Cost Information System**

One of the systems specifications for cost control reviewed by the members of the SAIMS working group and referred to in a later DoD report on the 13 current weapon programs surveyed was the *Production Cost Information (PCI) System Specification*, now employed on the Mark 48 Torpedo Program. This system was cited as one of the better program management cost control plans that were surveyed.

The Production Cost Information System contains the essential features listed in the requirements proposed by DoD in Mr. Bergquist's letter to industry on August 9, 1966, for contractor reporting of all hardware manufacturing cost and schedule data during development and production. The PCI System was developed through the combined efforts of representatives of the Ordnance Research Laboratory, Pennsylvania State University, Institute for Science and Engineering; Peat, Marwick, Livingston & Co., Mark 48 Program Office Procurement, ASWS Systems; Defense Contract Audit Agency; Naval Plant Representative Offices; and the contractors. Management consultants from Peat, Marwick, Livingston & Co., under contract to the Mark 48 Torpedo Program Technical Director at the Ordnance Research Laboratory, prepared and assisted in implementing the PCI System specification.<sup>1</sup>

The PCI System specification does not require a "new" system, in the sense that the basic manufacturing information reported is usually available in some form at the contractor and major subcontractor plants. The specification does, however:

- clearly state the specific data requirements for the contractor and his major subcontractors;
- require organization of all pertinent data;
- allow the contractor to utilize his own accounting and production reporting methods as long as the required data is complete, timely, and accurate.

### **Objectives of the PCI System**

The PCI System was developed to fulfill the follow-

<sup>1</sup> ORL-48-0-12: *Torpedo Mk 48 0 Unit Cost of Production Incentive and Production Cost Information System*, May 6, 1966.

ing objectives, which were outlined by the Ordnance Research Laboratory:

- To accurately reflect progress, display trends, and provide predictions at an early date for direct cost management action;
- To supply sound data for determining any earned incentive dollars and to provide the basis for follow-on contracting costs;
- To define clearly the requirement for evaluating, predicting, and accounting for the costs of engineering changes;
- To continually appraise the contractor's initially planned costs against actual costs and the actual value of completed hardware items;
- To ensure that the contractor's and major subcontractors' costs for manufacturing would be auditable as related to manufacturing hardware end items; however, reports would be summarized at the top levels (in this case, top levels are considered to be the Navy Program Manager's Office, the Ordnance Research Laboratory, and the prime contractor's Project/Program Office);
- To incorporate the principles of the Line-of-Balance technology<sup>1</sup> into the basic system design;
- To require little or no adjustment to the contractor's basic accounting system.

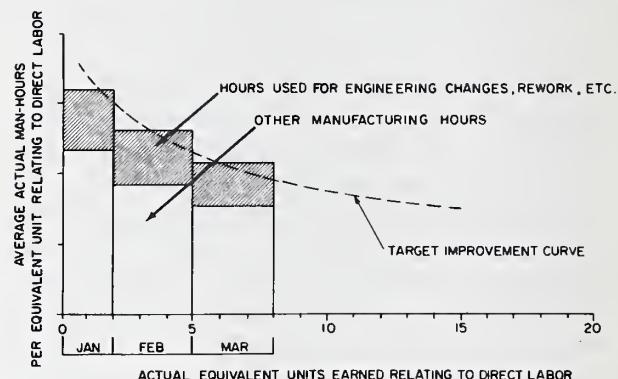
## System Implementation

The first phase in the implementation of the PCI System is the *identification* and *definition* of hardware to be manufactured and reported. A hardware family tree diagram (i.e., a tiered hardware breakdown structure) is the cornerstone of the PCI System. The number of levels of indenture into which the hardware diagram extends depends upon the cost visibility desired. The estimated dollar value of the hardware item, the hardware items for which competitive breakout procurement may eventually be exercised, and the common hardware items listed for future spare part procurement all influence the level of detail to which the contractor will identify, summarize, and report hardware and related costs.

The hardware family tree diagrams and the related contractor cost estimates provide the *baseline* (reference point) information to be utilized in preparing system planning data. The overall contractor program plan (i.e., the integrated work breakdown structure and related work packages) must, if it is to provide optimum value, take into consideration both the systems

engineering approach (i.e., functional) during early development and design phases of a contract and the methods of manufacturing and costing applied during the preproduction and production phases of a contract. The integrated work breakdown structure, therefore, is essentially a combination of the two considerations.

Once the hardware diagrams have been defined, the planned contract quantities, direct labor hours and dollars, material dollars, overhead dollars, and total dollars for each hardware item or block on the diagram are calculated. During the second implementation phase, the dimension of time is added on the basis of the contractor's manufacturing schedule. The contractor's (and major subcontractors') planned costs and value of hardware to be completed are displayed for each month that manufacturing costs are scheduled to be incurred.



## Production Labor Performance Report

At this time, the values of hardware items to be reported are fixed and are expressed in relation to their fractional value of completed end items (i.e., their equivalent value of a deliverable hardware end item that is selected as a reference). On the Mark 48 Torpedo Program, the torpedo configuration was selected as the reference, or equivalent unit. Thus, the value of one complete torpedo is 1.0, and all program hardware items to be reported are referenced (using estimated dollars) in terms of their fractional value of the torpedo. For example, if the value of one complete Mark 48 Torpedo is identified as an equivalent unit, completion of one assembly, which had been estimated to be one-tenth of the cost of the torpedo, would later represent an earned value of one-tenth of an equivalent unit. The point at which completions are to be later recorded are defined prior to actual production of the items, so that the planned values of hardware completed can be established for later monitoring of the contractor's actual performance.

To assure that the data for appraising the contractor's

<sup>1</sup> Issued by the Office of Naval Material under NAVEXOS P1851, dated April 1962.

production performance and trends in relation to plan will be accurate, estimated hardware values (as used to conduct the plan) can be changed only under specific conditions that are predefined in the contractor specification. A typical condition under which adjustments are allowed is that of contractor design changes which affect the addition or deletion of hardware items in the torpedo hardware configuration.

## System Reports

When the contractor's hardware content, account coding, estimated hours and material costs, completion schedules, and plan for reporting of actuals have been correlated, system reporting can be implemented. Three types of periodic reports are obtained from the system:

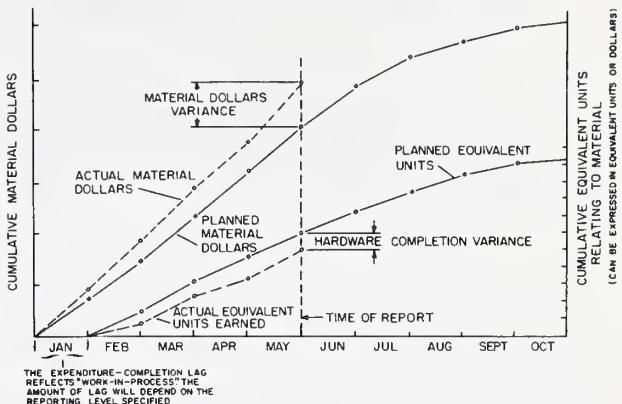
- Performance Reports periodically indicate how the contractor is performing in relation to the plan established at the outset of the project. Performance Reports include *Production Labor* and *Production Material Performance Displays*, which demonstrate the contractor's improvement trends and variance from plan on an equivalent unit basis for both labor and material. The cost resulting from engineering changes and contractor rework are also separately identified. (The Production Labor Performance Report is shown above. A similar material performance report is also submitted monthly.) Knowing performance status and trends as early as possible in a program involving major hardware items takes on significant meaning for cost management when one observes that procurements for major items span a 2- to 3-year expenditure period, and that from 40% to 60% of the contractor's dollars may be expended prior to delivery of the first end item of a given production contract.

- *Position Reports for Direct Labor, Material, and Total Labor and Overhead Dollars* demonstrate the contractor's cumulative position for each element and directly correlate his overrun/underrun to his ahead/behind schedule position for value of hardware completions. (The Material Position Report is shown below. Similar reports for direct labor hours and for direct labor and overhead dollars are also submitted monthly.)

- Variance Reports are the contractor's narrative description of specific actions initiated to correct unfavorable resource variances that indicate a departure from program plan of over 10% at the end of any given reporting period.

When the contractor has completed the production of all required hardware, summary reports are submitted that provide a record of the contractor's cost and performance experience during manufacture. All

manufacturing costs are summarized in relation to the hardware family tree diagrams in the same detail that the planning data was prepared at the outset, so that the actual unit costs for each assembly and for the end-item configuration can be calculated and reported.



Material Position Report

## Advantages of the System

In addition to achieving the major objectives initially outlined by the Ordnance Research Laboratory, the PCI System provides the following advantages, which result from the organization of data:

- Major subcontractors, cost managers, the prime contractors' procurement managers and program managers, and the procuring Government agency personnel can communicate in the same standard terms when appraising performance data.

- The contractor and Government procurement personnel have available a specific document that clearly states reporting requirements so that proper implementation—one of the most vexing problems to reporting for government programs today—can be readily verified by Defense Contract Audit Agency Reviews.

Finally, controlled reporting of actual manufacturing costs and schedules is implemented at the beginning of the manufacturing phase, and actual cost and schedule performance are related to the contract, the estimates, and the program plans. Cost data collected under these controlled conditions will place into the DoD data bank a valid source for comparison of "like" items of hardware. From this source, historical costs can assist in more accurately answering future questions of HOW MUCH WILL IT COST? □

*"Most of the opportunities to increase efficiency and to find less costly ways to do business occur in the work you do everyday."*

LYNDON B. JOHNSON

## Resources Management and Project Prime

The following is excerpted from "A Primer on Project PRIME", published by the Department of Defense Comptroller in November 1966. The Primer is explanatory and not directive.

"I want every manager to think of his part of the total Government in terms of everything he owns, everything he owes and the full cost of doing every job in relation to the products resulting from these costs. I want him to think of minimal costs and cost reduction as profit. And I want him to think in terms of his profit as a result of how he uses all the resources entrusted to him. These goals cannot be fully achieved without sound financial management practices."

LYNDON B. JOHNSON  
May 24, 1966

"I recognize that the Military Departments and Defense Agencies have a formidable task in developing and implementing the necessary changes in their own systems, and an equally great challenge in educating managers at all levels in how to use the new tools. Indeed, these tasks are never ending. I do expect that enough of these improvements will be accomplished by July 1, 1967, so that our emphasis can then be shifted to expense accounting in terms of organizational responsibility and program elements."

ROBERT S. McNAMARA  
June 13, 1966

### The Scope of Resource Management Systems

Resource Management Systems can be defined as those methods and procedures used throughout the Department of Defense that (1) deal with *resources* (manpower, real property, weapons, equipment, services, materials, and supplies); (2) are intended to assist in the *management* of such resources (planning, budgeting, acquisition, use, consumption, storage, and disposition), and (3) constitute *systems* (they involve recurring, orderly cycles of planning, reporting, and feedback information).

Resource Management Systems affect the entire management process in the Department of Defense. This includes programing, budgeting, management of investment items, management of operations, accounting, reporting, and auditing.

### The Role of Project PRIME

Project PRIME is the name given to that portion of the Resource Management Systems effort which must be accomplished by July 1, 1967. Basically, Project PRIME seeks to revise the programing system, the

budgeting system, and the management accounting system so that they will be more useful to managers at all levels. It is the core activity in instituting Resource Management Systems. The essence of the changes Project PRIME is making can be described in a few points:

1. Project PRIME is concerned with *operating* resources, as contrasted with *investment* resources. It has to do primarily with resources that are financed under the Operation and Maintenance and Military Personnel appropriations, not with the Procurement, Construction, or RDT&E appropriations.

2. Programing, budgeting, and management accounting will have an integrated structure. This means that the information used in these three systems will be consistent.

3. The focus is on *expenses*, that is, on the resources consumed by organization units in carrying out their part of the program. The programing system provides rough data on expenses by program element, but the present budgeting and accounting systems provide no information corresponding directly to program elements. In the current budgeting and accounting systems, perhaps only 15% to 20% of the resources ac-

# REPEATING

tually used by an organization are reported as costs of that organization. *The long-range goal is to charge an organization unit with 100% of the measurable expenses that it incurs.*

## The Historical Setting

Since the establishment of the Department of Defense in 1947, its management concepts and practices have been most dynamic. Change today is virtually accepted as a norm. The very nature of Defense activities requires innovation in the management environment to keep pace with national policy, changing strategic considerations, and dramatic developments in weapons technology. When viewed from a broad perspective, however, the management changes made during the past 20 years have been evolutionary and pragmatic. They have not been a repudiation of past practices, but rather a recognition that the state-of-the-art of management must move forward in order to be responsive to new demands and requirements.

In the years since Robert S. McNamara became Secretary of Defense, there have been many significant changes in the manner in which the Defense Department conducts its business. Many of these changes were initiated by Charles J. Hitch during his four and one-half years as Comptroller. They included the development of the Five Year Defense Program, the orientation of planning toward programs as well as resources, and the use of cost/effectiveness techniques to compare alternative plans. All of these innovations were directed toward improving the planning and strategic decision-making elements of defense management. These changes helped the Department of Defense make major strides forward in the systematic *identification of objectives and determination of resources required*, but they did not directly affect the *operating management of resources*. This, now, is the task of Resource Management Systems.

## Foundations

The development of Resource Management Systems is actually a continuation of efforts begun as far back as 1949. In that year, and the one following, foundations for the Defense Department's financial management systems were laid by amendments to the National Security Act and by the Budget and Accounting Procedures Act, growing out of the first Hoover Commis-

sion recommendations. These Congressional actions included authorizations to establish working capital funds and performance budgeting throughout the Defense Department. In addition, considerable work was done by the Appropriations Committees to realign the Department of Defense appropriations structure from over 100 accounts into a streamlined structure of about 40 accounts grouped into five major categories.

In 1955, the second Hoover Commission on Organization of the Executive Branch of the Government made a further examination of Defense Department management practices. The Commission found that—in the Department of Defense, effective fiscal management has been hampered by overdetailed and cumbersome allotment structures. The effect of trying to control operations through such a system places emphasis upon the ability of organizational units to expend no more than predetermined ceilings. The ability to live within such ceilings is no real gauge of performance. Accounting systems which disclose all costs . . . are a prime requisite to effective management.

The Commission then made a series of major recommendations for changes in accounting and budgeting procedures.

—That the executive budget continue to be based on functions, activities, and projects but be redesignated as a "program budget." The program budget should be supported by information on program costs and accomplishments, and by a review of performance by organizational units where they do not coincide with program budget classifications.

—That the agencies take further steps to synchronize their organization structures, program budget classifications, and accounting systems.

—That for management purposes, cost-based operating budgets be used to determine fund allocations within the agencies, such budgets to be supplemented by periodic reports on performance.

—That Government accounts be kept on the accrual basis to show currently, completely, and clearly all resources and liabilities and the costs of operations. Furthermore, agency budgeting and financial reporting should be developed from such accrual accounting.

—That, as a general policy, reliance be placed upon appropriate accrual and cost accounting techniques as a primary means for aiding the effective management of Government activities. The manner and extent to which funding devices are employed should be determined within the framework of the accounting systems so established.

—That, in the Department of Defense the accounting procedures be revised to include military pay as an element of cost of support activities of an administrative or service nature.

With the support of the Government Operations Committee, certain of these recommendations were adopted and enacted in 1956 as Public Law 863, amend-

ing the Budget and Accounting Procedures Act of 1950. Concurrently, Wilfred J. McNeil, the first Comptroller of the Defense Department, worked out a conceptual scheme he called a "Performance Type Budget," providing a basis for most of the concepts that we are applying today. In fact, the development and implementation of Resource Management Systems can be viewed as primarily an acceleration of the same implementation task begun by Mr. McNeil.

### Need for Integration

The changes introduced by Mr. McNeil resulted in significant improvements in many specific individual management systems. The application of the programming concept to defense management by Mr. Hitch continued this trend. However, no comprehensive effort was made to relate these individual management systems to each other and to the overall resource management needs of the Department of Defense. As a result, a proliferation of management systems, of widely varying degrees of usefulness, developed with consequent overlapping, gaps, and conflicts among them.

When Robert N. Anthony was appointed Assistant Secretary of Defense (Comptroller) in the summer of 1965, he was asked by the Secretary of Defense to make major changes in programming, budgeting, and accounting systems by the start of the 1968 fiscal year on July 1, 1967. This portion of the effort was named Project

PRIME (an acronym for *Priority Management Efforts*) to underscore the urgency of completing this huge task in such a short time. Mr. Anthony was also asked as part of the Resource Management Systems effort to study systems for the management of inventory and capital acquisitions, and to develop a top management reporting system, in addition to improving management education and motivation so that the new systems would be put to effective use. He was also given the task of coordinating the development of new resource management systems and changes in existing systems through his office. These additional tasks were to begin immediately, but were not tied to the July 1, 1967, implementation date of Project PRIME.

The request for such action was parallel with the request for the Executive Branch of the Government. A memorandum from President Johnson, dated May 24, 1966, requested that all Departments and Agencies accelerate the pace of the Joint Financial Improvement Program. Specifically, the memorandum requested each Agency to take immediate action to:

—Assure that financial reports and cost data provided adequate support for the planning-programing-budgeting system.

—See that the Agency's managers are given the basic tools they need—responsibility centered cost-based operating budgets and financial reports—for setting and achieving maximum cost reduction goals.

It is precisely to these goals, and those articulated by the President . . . that Resource Management Systems and Project PRIME are addressed. □

### A FIRST FOR U.S.S. CACAPON

Machinist Mate Chief Dean T. Perkins, shown in photo at right, became "number one" on the U.S.S. *CACAPON* (AO-52) by being the first military man on his ship to receive a cash award under new regulations which now authorize cash payments to military personnel for adopted suggestions and ideas. Previously, cash awards went only to civilian employees.

Chief Perkins was awarded \$150 by Captain Stanley Sloan, CO of the U.S.S. *CACAPON* for the design and installation of an improved lubrication system for the ship's steering engines. The new system not only saves over \$500 annually but also improves the reliability of the entire steering mechanism. The system enhances the ship's safety during the critical alongside phase of underway replenishment.

The modification idea has been forwarded to the Naval Ship Systems Command for approval as an alteration for permanent use in other ships.

Chief Perkins entered the Navy in April 1944, and has seen action both in World War II and the Korean

war. As Chief Petty Officer of the Auxiliary Division he is responsible for maintaining all of the *CACAPON*'s auxiliary equipment in reliable operating condition. □





# INNOVATION

## *Some Professorial Comment*

**By DR. EDWARD BARNET**  
*Associate Dean*

**School of Business Administration**  
**University of Hawaii**

The Journal learned that in Aloha-land there lived a professor whose commentaries on innovation and cost reduction were worth hearing. We phoned him and received permission to transcribe some of his chatty observations for Journal readers.

### ***The High Invisible Cost of Non-Thinking Time***

We are buffeted all day long by instantaneous stimuli of problems assaulting us through the telephone and elsewhere. We don't have time to do much thinking. Actually we react—we react as fast as the urgency demands, and we don't really have time to make an appointment with ourselves, and meditate. I want to talk about the significance of innovation and its implications for cost reduction. First, I should define innovation and then discuss an approach to costs which the economists call, as opposed to the CPA's, Opportunity Costs. Now the economists' definition of opportunity costs is: What you could have gained with the uses of your time and resources that would have brought you a greater gain than your rewards from what you are presently using your time and resources for. The difference is opportunity cost. What is the allocation of your resources to maximize or optimize the *greatest opportunity?* That is looking at costs *positively*, from the point of view of alternative allocations of scarce resources (such as of time, material, money and men).

### ***More Than the Mere Sum of Parts—The Gestalt***

In a sense we have to look at this from the point of view of the whole; in psychological parlance the psychologists called it the Gestalt—the whole thing. Looking at things, not piecemeal but from the point of view of a totality, depends on your frame of reference—how you see things.

### ***Polishing Doorknobs—While the Ship is Sinking***

One of the classic illustrations was the crew on the Titanic. They were so well trained that they were polishing doorknobs as the ship was sinking, a conditioned reflex to stick to duty and *keep polishing those doorknobs*, when their allocation of effort might have been more profitable elsewhere. How many of us are polishing doorknobs because we are thinking in terms of *solving the problem, in terms of yesterday's frame of reference* rather than today's?

### ***What Is a Fact?***

An Italian philosopher, named Pareto, who wrote sociology in French while living in Switzerland, described a fact in a very expensive way (I usually charge a fee when I give this definition). He said, "A fact is a receptor experience (that is a simple way of saying—anything perceived through the five senses), a fact is a receptor experience *in terms of a conceptual scheme*." In other words, your eyes photograph it, you interpret it in the perspective of your language, your environment, your childhood, the influences you have been subjected to, the things you have come to learn and *only* in the terms of a conceptual scheme. We can only see what we are trained to see. If we look at a desk we say it is a desk, but somebody from a primitive culture might consider it a place to hide under from the rain if he has never seen a desk; or a physicist might see it as a bunch of dancing molecules holding hands.

## Which Theory Are We Using?

In other words, we all look at the world through the *ideas* we are *conditioned* to look at the world through. The unfortunate part of all this is that the world is constantly changing at an accelerating pace.

## Obsolescence of "Eyes"

At Michigan State the last year I was there, 50 electrical engineers with doctors degrees only 10 years old came back to the university and demanded a 1-year program to retread their minds, so they could understand the people they were hiring out of the colleges today. The point here again is that there has been such an accelerated evolution and revolution in the technology and knowledge required in these fields (in fact all fields of endeavor) that the rug is constantly being pulled out from under men whose 20, 30, or 40 years of experience is being written off as junk, as obsolete machinery is written off because it is outdated. We are living in a world that is characterized by innovation.

## Creative Destruction

The dynamics of innovation were written up extensively by an economist named Schumpeter who was incidentally the last Finance Minister of the Austrian-Hungarian Empire. He taught at Harvard in his declining years. Schumpeter described innovation as "The process of creative destruction." We see it every day in every facet of life: medicine, architecture, building and construction requirements, educational programs, textbooks. We have to say to our students in all honesty that anything they are learning today will be obsolete in 5 years. All we can hope is that they will *learn how to learn*, and have a basis on which to *keep on learning*, because the rate of new knowledge is rising.

## Innovistic Competition

We are living in a period characterized by innovistic competition. I wrote an article entitled "Showdown in the Marketplace," with this thesis in mind: that maybe Thoreau and Emerson were right when they said that if you build a better mousetrap the world will beat a path to your door; but actually, the world is too busy today and it doesn't beat a path to anyone's door. You have got to deliver the mousetrap to places where people are walking around, such as in a supermarket. They won't go into another kind of store as they used to (such as a general store or a hardware store) and say,

"Do you have any mousetraps?" They want the mousetraps to be with the pineapples, toothpaste, the beauty aids, and the frozen foods. It is not sufficient to make a better product, you've got to tell people you have got it; you've got to tell them it is better; you've got to pay for a color television advertisement; you hire expensive copywriters; you get expensive package designers; and you have a whole crop of researchers and developers to design the product in the size and color and price line that people are willing to pay.

## The Process of Innovation

As long as I had the power to define "innovation" in my own book, I defined it this way—"to maintain position over time." You have got to keep running to stay in the same place. You have watched children on Saturdays going up, going down escalators in department stores. They run up like mad as the escalator comes down, and the faster they run the more they tend to stand still or get ahead. We are either standing in the same place or getting ahead. That is innovation—to maintain position over time.

Now, what constitutes the process? We are all born into a situation—whatever it may be. It may be as a first child, or a third child in a poor family. If a first child, it is one environment; by the time the third child comes along it may be a wealthy family. They can't say children are all brought up in the same environment. It varies—besides the third child has the advantage of two others to help and warn him about parents.

So whatever the situation may be, it is either compelled or induced. It may be glaciers as it was for prehistoric man. We are always in a situation. The question is: Do we recognize the situation? Do we know how to size it up? Do we have seeing eyes that relate parts to the whole? Those are the questions I started with. How do we develop a holistic approach so that we are not looking at the doorknobs? Are we looking, thinking, and wondering how to get life-savers distributed? How do we diagnose the situation?

General Woods is famous for resurrecting Sears, Roebuck. For recreation, General Woods read the United States Statistical Abstract (it is not the usual form of recreation of anyone else that I ever heard of).

In the United States Statistical Abstract for the Census Year 1919, he noticed two interesting points: one was that for the first time in U.S. history, over half the population had moved from rural to urban communities; and he also noted that there were over 39,000 automobiles privately owned. As those two little bits started fermenting in his head, he said, "What is

going to happen to the mail-order house if people move into the cities or drive into town and can see the stores? What is the future of the mail-order houses?" When he came back to Chicago (he was working then for Montgomery Ward), he said to the President: "I think we ought to get into the retail store business."

To make a long story short, after great skepticism, greater soul-searching, and the greatest caution, Montgomery Ward did get into the retail store business. Into one of those stores came Julius Rosenwald who was head of Sears, Roebuck. The store was in Hammond, Indiana. Rosenwald walked all around the store and he said to the manager, "I don't think mail order companies should be in the retail store business, but I do like the music those cash registers are playing." He then hired General Woods from Montgomery Ward, put him in charge of all retail operations and today about 85% of Sears, Roebuck business is in retail stores. Of the over \$6 billion that Sears does annually (about 85% in stores), that 15% still in the catalogues is bigger than Sears was at the time they made this change.

### **Seeing Eyes**

We are living in a period when some guy has some seeing eyes that could relate two little concepts out of the Statistical Abstract to a new concept of the whole. Out of that, Woods got the idea—you don't put stores out in the major downtown shopping centers; you build them on the main arteries leading into town, where the ground costs are lower, the rent is lower, and you can build parking lots for some of those 39,000 privately owned automobiles. How many do we have now? Ninety four million, or something equally absurd! None the less, the idea of a shopping center grew out of that basic idea. The process of seeing the world changing and relating what we see to opportunities is what I mean about looking at costs *positively*. New investments in opportunity may require much additional capital, but reduce the per unit costs of production and thus permit a lowered price in distribution.

Sears had their own problems. There was opposition. They made false starts. They had skis in their Florida stores. As a matter of fact, they were doing so badly at the start, they even had a merger plan in mind. Anyhow they had adjustments, external and internal. They achieved acceptance. They were among the first of the big ones. It became institutionalized, the way all things do. Even the supermarkets have become institutionalized; and today there are those who have seen the innovation of mixing meats, dry groceries, and fresh fruits and vegetables, are copy-

ing it, and are rendering it obsolete by introducing the discount house, you see, which combines both the food and the hardware. So, whoever is innovating has got to realize that while he may develop a monument, it too is threatened by the speed of its acceptance. Somebody reappraises the situation, and innovates again! This process of innovation goes round and round. This is the process of innovation.

### **Ideas Must Be Sold**

The idea of costs as a weapon of selling is now becoming indispensable. You have to sell your ideas even in the Military Establishment—to other groups who have to pass on an approved proposal for appropriation, especially now with computers and a very statistically minded Secretary of Defense. I had the pleasure of having him as a guest one time in 1948 at the University of Buffalo when he had just joined the Ford Motor Company as a bright, young, eager statistician, and I caused him to miss his plane. He was eager to get back to Detroit, but he was so interesting I forgot to drive fast. He was telling that Ford did not know how many spare parts they had in dealers' warehouses or in their own warehouses, and they were bringing some order out of chaos. It was very interesting because Henry Ford I was a great innovator. He was not an administrator. You need both.

### **To Be Practical You Must Be Theoretical**

Today an administrator cannot afford not to be an innovator, because the world is changing under his feet. The challenges we face call for new kinds of viewpoints. We need time to think, and we have to reserve for ourselves the time to think about standard everyday routine problems in an entirely new light. We must ask what can be done about the problems by innovating conceptual schemes that we acquire by reading the newspaper, watching television or reading "Peanuts." □

---

### **McDONNELL COMPRESSES COSTS**

By installing equipment to compress trash prior to removal, McDonnell Aircraft Corporation is saving \$61,547 annually. Trash removal costs have been reduced 32% because of the increase in weight per cubic foot. □





*Army ski troops in full Arctic gear.*

## AVALANCHE OF SAVINGS FROM ALASKA

When U.S. Army Alaska sends in its quarterly cost reduction reports you can be sure that the results represent something other than a "snow job."

Though ranked as one of the smallest major commands of the Department of the Army, the U.S. Army, Alaska, took it seriously when President Johnson urged the philosophy of "a tight fist and an open mind" to insure a dollar's worth of National Defense for every dollar of our taxpayer's money invested in that cause.

In implementing the Department of Defense and Department of the Army Cost Reduction Program, USARAL proceeded on the basis that the best antidote for inertia is action. This concept has produced some striking results.

The USARAL Cost Reduction Program, in the three years since its inception, has resulted in savings of more than \$14.7 million. Total goals for the period FY 1964-1966 were \$7,587,500 while savings for the three year period have totaled \$14,771,200. These savings are broken out by fiscal year as follows:

FY 1964-----	\$1,549,100 or 99.6% of annual goal
FY 1965-----	\$4,914,800 or 152.7% of annual goal
FY 1966-----	\$8,307,300 or 304.2% of annual goal

Following, are a few typical examples of actions and techniques employed in the U.S. Army Alaska's war on waste:

- Installation of automatic controls in a heating plant at Fort Greely, Alaska, permitted unattended op-

eration of the plant and reduced operating costs by \$51,000. The automatic control installation included remote metering and alarm equipment to permit personnel on duty in the main Post powerplant, more than a mile away, to monitor the heating plant operation. The unattended heating plant supplies steam heat to hangars and other facilities of the old Post area of Fort Greely. The cost of control installation, \$19,000, was amortized by savings in less than 5 months.

- An automatic chlorinator was installed in the Fort Richardson field house, to improve swimming pool chlorination and eliminate operator requirements. The new chlorinator is the first of its type to be installed in any swimming pool and continuously maintains chlorine residuals within limits unobtainable by previous manual control procedures. Annual savings of some \$9,200 were realized with an initial expenditure of less than \$500.

- Noncombat vehicle managers established a reduction in maintenance intervals from quarterly or 3,000 miles, to 4,000 miles without regard to time in months, and extended lubrication and inspection intervals from 1,000 to 2,000 miles. USARAL's three transportation motor pools generate validated savings in excess of \$5,000 per quarter using this extended maintenance technique.

- In FY 1965, an extensive management study of U.S. Army, Alaska Operational Projects was initiated by ACofS G-4 Headquarters USARAL, to determine

whether Operational Project requirements could be refined without a corresponding reduction in overall unit readiness, mobilization readiness and combat capability. The special study was of approximately 1 year's duration and upon completion, indicated that major reductions in Operational Project authorizations could be made; and at the same time, by revising the overall program and by better tailoring of item requirements to contingency plans, a major improvement in USARAL's tactical and logistical posture could be realized. Accordingly, full and realistic alignment of logistical projects with tactical concepts was achieved which heretofore did not exist in USARAL. These improvements were accomplished with simultaneous reductions of 46% in item requirements and 42% in dollar requirements. Additional special studies were conducted to determine where the eliminated Project assets could be applied. In general, these assets were used to satisfy deficiencies in war reserve stocks, current (unit) issue requirements, operating level and retention level requirements, which, in turn, precluded CONUS procurement and shipment of like items to Alaska. The completed management study and proposed action was submitted to and approved by Department of the Army without change. When all the smoke had cleared away, USARAL had realized a net, one-time saving of \$5,669,242.

• The USARAL Yukon Command had been operating its tracked vehicles the year around with the track pads installed. As track pads are designed primarily to reduce damage to improved roads during summer operations, the requirement for their use during winter operations was evaluated. As a result of this evaluation

it was determined to remove the track pads during winter operations and reinstall when required. The above action resulted in a saving of \$55,000 by reducing wear and replacing requirements.

• In FY 1965, the Department of the Army directed an exchange of UH-1 helicopters between USARAL and CONUS manufacturers for modification and replacement. The exchange was arranged for by the U.S. Army Aviation Materiel Command and provided that the aircraft would be moved by ferry flight to and from Alaska. However, investigation and comparison of costs involved, disclosed that movement of the aircraft could be accomplished by air transport rather than by ferry flight at a considerable saving to the Government. Recommendations for movement by air transport was approved by Department of the Army and completed by use of Military Airlift Command C-124, which resulted in a saving of \$161,375.

• In FY 1966, action was initiated by USARAL transportation and traffic managers to negotiate a reduction in freight rates as follows: A volume movement of explosives was made, using special through rates from highway carriers for direct movement from Alaska origins to Umatilla Army Depot, Oregon. New techniques employed were:

- (1) Elimination of transshipment activity (Bangor, Washington).
- (2) Coordination of fast truck dispatch and turn-around plan with carrier.
- (3) Realignment of traffic flow pattern.

Employment of the specially negotiated freight tender resulted in a saving of \$99,055 over previously existing lowest traffic rates.

***Track pads used in summer, but removed in winter to reduce wear and replacement requirements.***



***UH-1 Helicopters moved by air transport in lieu of ferry-flight saves \$161,375.***



- In FY 1966, Fort Wainwright reported savings of \$956 per quarter, through the use of disposable cardboard boxes in lieu of paper grocery bags. The boxes are generated at no cost to the Government as a result of stocking the commissary store. This also eliminated the use of civilian labor previously required to burn these boxes each day.

- In FY 1966, a management study was initiated by USARAL Yukon Command toward the consolidation of certain maintenance activities. Completion of the study indicated such consolidation to be feasible and practicable, whereupon, actions were initiated which resulted in deactivation of a Supply and Maintenance Company and an Engineer Detachment, and the establishment of a Consolidated Support Maintenance Activity. The consolidation resulted in a reduction of four (4) civilian and forty (40) military personnel spaces and a net annual saving of \$141,300.

It will be noted that the above actions range from highly technical and complex management actions to

actions which are prime examples of sheer simplicity. However, they all have two things in common:

1. They all demonstrate imaginative and aggressive leadership and individual ingenuity and initiative.
2. They all have saved American tax dollars.

One might ask, how has it been possible to generate such a record of savings within a command no larger than USARAL? Well, its like this; USARAL compares its approach to cost reduction with a snowball on a mountain side. Left alone, little happens until the first thaw when it slowly disintegrates and melts into nothingness. But, with a little push in the right direction, this same snowball can start rolling, and gather momentum along the way, and increase its size more than a thousandfold.

So it has been with the USARAL Cost Reduction Program. By substituting action for inertia, giving the needed "push" at the start, and with continuing guidance, the cost reduction program has snowballed into an avalanche of savings. □

### **"SOUPED-UP" SKYRAIDER**

Modification of 213 engines for use in the Skyraider aircraft gave combat forces in South Vietnam the kind of basic engine integrity they needed and at the same time saved the Air Force \$10.7 million in the FY 1966–FY 1967 timespan.

*A-1E "Skyraider"—Tactical workhorse of the fighting in Viet Nam.*



The A-1E Skyraider, a modified World War II Navy dive bomber used primarily by the Navy for patrol and training purposes, was adopted by the Air Force for special forces support in 1963 and began combat operations in Southeast Asia in the latter part of 1964. However, this new combat mission for the Skyraider called for more engine capability than the standard R-3350-26WD aircraft engine was able to muster.

The system support manager of the aircraft asked the Air Force Logistics Command to buy a new engine, the R-3350-26WE, at a cost of \$85,000 per engine in order to meet the performance requirement.

Hugh Mathews, William B. Bywaters, and Henry L. Wilson of the San Antonio Air Materiel Area (SAAMA), Reciprocating Engine Item Management Division at Kelley AFB, Texas carefully studied the standard engine and found that it could be "beefed up" to meet the added performance requirement. These individuals recommended incorporating newly designed cylinders and new parts into the standard engine in order to provide greater reliability in all areas where failure trends had been experienced.

An important additional factor favored modification of the existing engine in lieu of procurement of the R-3350-26WE. That factor was the reduction in lead time (16 to 18 months for procurement of the new engine; only 2 months for procurement of the overhaul kit needed to modify the R-3350-26WD's). □

# DoD QUALITY AND RELIABILITY ASSURANCE

## *Administration and Organization*

By JOHN J. RIORDAN, *Director for Quality and Reliability Assurance*

Office of the Assistant Secretary of Defense  
(Installations and Logistics)

(THE FOLLOWING ARTICLE IS PART II OF A TWO-PART SERIES ON DEPARTMENT OF DEFENSE QUALITY ASSURANCE POLICY. PART I APPEARED IN THE FALL ISSUE OF THE JOURNAL.)

### Scope

The supplies and equipment that flow to operating commands and users throughout the Department of Defense originate largely at industrial plants under contract to the Department of Defense (DoD) or at DoD storage and maintenance facilities. The dominant purpose of the DoD Quality and Reliability Assurance Program is to make sure these supplies—regardless of source—satisfy user needs.

### Responsibility

Responsibility for direction of the DoD Quality and Reliability Assurance Program is assigned by the Secretary of Defense to the Assistant Secretary of Defense (Installations and Logistics). While this program is based on a panoramic perspective of quality—inclusive of procurement, maintenance and storage and their interactions—major interest has been centered historically on procurement quality assurance, the subject of the subsequent paragraphs of this paper.

### Basic Concepts

The pattern of organization and administration for procurement quality assurance is in a constant process of adjustment to the changing scene—particularly to innovations in design and in procurement practices. Nevertheless there are certain bedrock principles that underly organizational and administrative practices. These are:

1. The procurement quality assurance function is an element of the broader function of contract administration.
2. The primary responsibility of the Department of Defense procurement quality assurance organization is to make sure products purchased from industry conform to contractual requirements. The contract is

presumed to incorporate requirements adequate to assure fabrication by the contractor of usable products.

3. The best interests of both the Department of Defense and industry are served when the procurement quality assurance organization shows “one face” to industry—that is, when the DoD is represented by a minimum of quality assurance organizations.



4. The viability of the procurement quality assurance organization, from the plant level up through the Office of the Secretary of Defense, is dependent decisively on strong management direction and on clear organizational identity.

5. The effectiveness of the procurement quality assurance organization—at all levels—is contingent on the authority to render objective and independent judgments of product integrity.

6. The procurement quality assurance program must be responsive to the technical direction and control of program managers and must be executed in accordance with procedures they specify.

7. Economic and technical considerations dictate that DoD objectives in procurement quality assurance are best achieved in collaboration with, rather than duplication of, similar activities in industry.

8. The quality and reliability assurance program, of necessity, must be adjusted to reflect data and information derived from using activities. In the absence of such information, quality and reliability assurance organizations—to paraphrase Santayana—are destined to tolerate the errors of the past.

The aforementioned principles are, in substance, incorporated in various DoD Directives and Instructions, particularly in DoD Directive 4155.11 and DoD Instruction 4105.59. There are other principles, however, that are not so enshrined but deserve mention despite their obviousness. These are:

1. The first line of defense of the DoD against defective materiel is effective design.

2. The second line of defense is the contractual package—including specifications. In passing it might be said that if there is an Achilles heel in quality assurance, it is to be found in the limitations of current theory and methods for specification preparation. Specifications are the basic tools of the quality assurance trade.

3. The effective implementation of DoD procurement quality assurance policies necessitates flexibility in planning and administration at the plant level. This is particularly true with respect to the intensity of DoD verification of contractors' quality and inspection programs and related information.

4. The DoD quality assurance personnel at the plant level are the true VIP's of the DoD quality assurance program. Not only are they the DoD's front window to industry, they also collectively constitute the final barrier protecting the user from inferior or unsafe supplies and equipment.

5. As a derivative of 4. above, procurement quality assurance personnel at the plant level must bring to their work technical knowledge and skills commensu-

rate with the technological character of the industry with which they are associated.

## **Historical Background**

Until the late 1940's the procurement quality assurance organizations of the Departments of the Army, Navy, and Air Force were separate and autonomous within their respective Departments. In many instances the Bureaus and Commands of the Departments maintained separate organizations. In line with the increasing trend toward interservice coordination and cooperation during the post-World-War II period, the DoD undertook, in the early fifties, a major program to effect cross-servicing among these various organizations. Thus, in accordance with the now canceled DoD Instruction 4155.7, "DoD Policies and Procedures for Interchange of Services Among Procurement Inspection Activities," single military service inspection was instituted at numerous industrial manufacturing plants. This successful program was an important prelude—a conditioning instrument—for events that were to follow later in the 1960's when the DoD inspection organizations were consolidated as a single element of a larger contract administration service.

The considerable success of the Inspection Interchange Program in the midfifties induced further studies to determine the feasibility of organizationally integrating the inspection services, of which there were at least 14. The most ambitious of these studies was made by an "Interdepartmental Study Group on Inspection and Related Contract Administration Functions" (PIRCAF). This study was made in the summer of 1957 and a report submitted to the Assistant Secretary of Defense (S&L) in October of that year. Its most salient point was that consolidation of the inspection services was not practical without consolidation of related contract administration functions. Thus this study foreshadowed the later and more comprehensive Project 60 instituted by Secretary McNamara.

Project 60 had as its objective the determination of feasibility of integrating into a single organization contract administration functions generally, including procurement quality assurance. The findings of the Project 60 study were reported to the Secretary of Defense in mid-1963. This led to the establishment of the Defense Contract Administration Services (DCAS), an organizational element of the Defense Supply Agency (DSA).

It might be said in retrospect that the shape and form of the current procurement quality and reliability assurance program has been determined most influentially by Project 60 and by the "supplier responsi-

bility" concept for quality assurance as reviewed in a previous paper. However, the Inspection Interchange Program and the PIRCAF study were no minor actors in the events that have led to the present administrative and organizational structure.

## **Organization**

With the exception of approximately 120 facilities under the direct quality assurance cognizance of the Military Departments, all procurement quality assurance is now effected by the DCAS. Thus the Department of Defense has gone a long way—but not all the way—toward "one face" and "one voice" in its relations with industry.

The line of authority in quality assurance within the Defense Supply Agency is from the Director of the Agency to the Deputy Director for Contract Administration Services who, in turn, has under him an Executive Director for Quality Assurance. The DCAS has 11 regions throughout the United States and in each of these there is a Director for Quality Assurance. The quality assurance function represents the single largest element in contract administration. Approximately 45% (or 9,500) of DCAS personnel are assigned to the quality assurance area.

While the great bulk of the procurement quality assurance function is now the responsibility of DCAS, the Military Departments are still assigned important responsibilities in quality and reliability assurance management. As previously stated, the DoD quality and reliability assurance program encompasses more than procurement. It includes many other areas, particularly maintenance and storage, as well as coordination with numerous functions that chronologically precede procurement—especially design and specification preparation. In these various areas criteria for quality evaluation must be developed. Quality problems, constantly asserting themselves, must be resolved. The procurement quality assurance programs at those plants under Departmental cognizance must be managed. And systematic reviews must still be made to determine the adequacy and currency of contractual requirements for quality and reliability as well as of the practices by which conformance to these requirements is determined. Thus the Military Departments and DSA have a sizable quality job to accomplish.

Within the Army, policies and guidance pertaining to procurement quality and reliability assurance flows from the Assistant Secretary of the Army (Installations and Logistics) to the Army Materiel Command and is implemented by the five commodity commands of the Army Materiel Command. The channel of authority

within the Navy is similar to that of the Army—from the Assistant Secretary of the Navy (Installations and Logistics) to the Naval Material Command and then to the Systems Commands. Within the Air Force, procurement quality and reliability assurance policies and guidance flow from the Assistant Secretary of the Air Force (Installations and Logistics) through the Deputy Chief of Staff (Systems and Logistics) to the Air Force Systems and Logistics Commands.

## **Inter-Agency Relations**

The DoD procurement quality and reliability assurance program is not an island unto itself. For example, the DoD provides procurement quality assurance support to the National Aeronautics and Space Administration (NASA) and, in this role, has contributed importantly to NASA achievements in space. A NASA-DoD Reliability and Quality Assurance Committee provides a forum for discussing and resolving problems of mutual interest. Likewise, an NBS-DoD Consultative Committee provides a means for DoD and the National Bureau of Standards representatives to exchange views on calibration and metrology problems.

Additionally, by invitation, various Government agencies participate in the meetings of the DoD Quality and Reliability Assurance Council—a flag and general officer rank interdepartmental group under the chairmanship of the Deputy Assistant Secretary of Defense (Equipment Maintenance and Readiness). This Council initiated the DoD Quality and Reliability Management Conference of August 1966 at Annapolis which was sponsored by the Office of the Secretary of Defense (OSD) and directed by the U.S. Army Missile Command. The Annapolis conference concerned itself with a broad range of quality and reliability problems in areas ranging from research and development through product maintenance and utilization—problems of interest to Government agencies generally, as well as to industry.

On the international level, consultation on NATO quality matters is effected through the "NATO Group of Experts on Inspection and Quality Control." This Group has prepared a NATO specification quite similar to specification MIL-Q-9858A, "Quality Program Requirements," that will likely have wide application in Europe.

## **Looking Ahead**

The establishment of DCAS has enormously strengthened the effectiveness of procurement quality assurance operations. The existence of a strong procurement

quality assurance organization, as well as a continuing vigorous effort to improve the implementation of the "supplier responsibility" concept for quality assurance, opens broad and exciting vistas for sharpening quality assurance techniques. Whether these vistas are simply far off hills or ground to be actually trodden depends largely on four factors:

1. *The assignment, to the fullest possible extent, of decisionmaking authority to procurement quality assurance organizations at the plant level.* Such assignment, of course, must be within the framework of the provisions of contracts. The realization of this objective can be helped substantially by the inclusion in specifications and contracts of more explicit quality and reliability requirements. When these requirements are less than explicit, the decisionmaking effectiveness of procurement quality assurance personnel is seriously compromised.

2. *The achievement of a "new look"—a kind of technological charisma—in quality assurance.* This "new look" is necessary to help erase a traditional image of technical dullness. Whether or not quality assurance organizations acquire this new habiliment is contingent critically on the consideration expressed in 1 above. Unless quality assurance is technically exciting, it is not likely to attract competent and imaginative new talent.

3. *The clearer identification of quality assurance with the economic objectives of the Department of Defense, particularly in the area of cost reduction.*

This, in turn, is dependent on the development of new techniques for cutting costs through defect prevention and for assessing the dollar benefits of preventive action. Under the "supplier responsibility" concept for quality assurance, the Department of Defense procurement quality assurance organizations can contribute importantly to cost reduction.

4. *The development of plans and methods to move procurement quality assurance planning upstream.* Work is currently underway to develop a "work element statement" to which contractors would be responsive at the RFP (Request for Proposal) stage of procurement. In advanced and highly innovative hardware, the characteristics of quality and reliability are too critical to be left to a quality program improvised after the contract is placed.

It can be expected that in the period ahead procurement quality assurance will evolve rapidly as a more technological and cost-oriented function. This expectation is founded on more than mere hopefulness. It is founded on events already underway and on a reading of the lively recommendations of the Report of the Annapolis Conference on Quality and Reliability Management.

(The author acknowledges the assistance of Lt. Col. W. H. Lytle, USA, in preparing some sections of this paper, and the editorial contributions of Mrs. Genevieve W. Tidd. The opinions expressed and editorial accuracy are, however, solely the responsibility of the author.) □

## POSITIVE PAYOFF FROM SMALLER NEGATIVES

*Photographers from the 475th Radar Evaluation Squadron compare the many advantages of switching from the bulky, hard-to-handle press-view camera (left) to the simpler, more economical 35mm camera (right) for use during inspection of radar sites.*



A switch from bulky press cameras to smaller 35mm cameras for photo-lab operations of the Air Defense Command's 4754th Radar Evaluation Squadron, Hill AFB, Utah, saved the Air Force \$2,100.

The squadron, one of two in the Command, makes frequent inspection visits to radar sites. As a part of the trip report, inspection personnel are required to take pictures of the images reflected on the radar scopes. The film is developed while the team is on the road to insure that the pictures are adequate and will be readily available for submission with their inspection report. The equivalent of about 10 rolls of 35mm film are used on each of the team's four trips per month.

The change to 35mm cameras provided several advantages over the 4X5 press-view cameras. The film is less expensive and much easier to process in the field; the smaller camera is easier to operate and less cumbersome to handle. The fine grain film in the 35mm cameras is also used for large blowups. □

## HONOLULU FEDERAL EXECUTIVE BOARD HOLDS COST REDUCTION SEMINAR



*Attendees listen attentively to presentations by outstanding speakers during the recent cost reduction seminar held by the Honolulu Federal Executive Board.*

Over 300 representatives of Government agencies in Hawaii and throughout the Pacific gathered in Honolulu on 5 October 1966 to discuss the latest developments in management improvement and cost reduction and to exchange ideas on practical ways to reduce costs. The seminar was held at Fort Shafter under auspices of the recently organized Honolulu Federal Executive Board which is composed of military and civilian heads and executives of Federal agency organizations located in and around Honolulu. The Board is headed by Mr. Phillip M. Swatek, Director of local FAA operations.

The program included presentations by distinguished authorities on management and cost reduction. Among them were:

Mr. Lee Grossman, cost reduction specialist and consultant with the firm of Wyatt and Morse, Inc., Chicago, Illinois;

Dr. Edward Barnet, Associate Dean, University of Hawaii, School of Business Administration;

Mr. Grant W. Canfield, Vice President, Manager Membership Services Department, Hawaii Employers' Council;

Mr. Jackson E. Woolley, Assistant Director of Management Training Programs, Hawaii Employers' Council;

Mr. Billy A. Wann, Value Engineer, Pearl Harbor Naval Shipyard;

Mr. W. Russell Graham, Jr., Assistant Director for Programs, Naval Audit Service, Washington, D.C.

An additional item, "The Role of the Government Cost Reduction Administrator" by Mr. Harrell B. Altizer, Director of Cost Reduction Policy, OSD, was provided in printed form to attendees.

One of the highlights of the seminar was the receipt of the telegraphic message from the President of the United States as follows:

"I strongly commend your Federal Executive Board for conducting a cost reduction seminar at a time when we are asking great sacrifices of our soldiers in Vietnam and restraints by individuals and businesses at home.

"I expect every Government employee to spend every public dollar with the same care and concern he would exercise if it came from his own paycheck.

"I am counting on your Federal Executive Board for support and help in the war on waste, and I add my best wishes."

Captain Earl J. Hanson, Comptroller of the Pearl Harbor Shipyard and director of the seminar, reports that the presentations were enthusiastically received and most participants expressed hope that a similar meeting will be held next year. □

## NEW HANDBOOK FOR CONTRACTOR PROGRAM

There is good news these days for contractors on the cost reduction bandwagon. The Defense Contractor Cost Reduction Program now has a handbook.

All formal guidance for the Contractor Program and its relationships to Defense's Internal Program is in the handbook. It includes all current forms and instructions for the Contractor Program and pertinent portions of interim guidance for the Internal Program—with the criteria for the five individual interface areas of "Technical Manuals", "Technical Data and Reports", "Utilization of Excess Contractor Inventory", "Eliminating Goldplating (Value Engineering)", and "Packaging, Preserving and Packing". There is a current listing of corporations, reporting units and assigned Defense monitors. A section on news stories and articles is also provided.

This first issue of the "Defense Contractor Cost Reduction Program Handbook" (DoD 7720.12-H) was published in December 1966 by the Directorate for Cost Reduction Policy, Office of the Assistant Secretary of Defense (Installations and Logistics), Pentagon, Washington, D.C. 20301. Copies have been sent to participating corporations, their reporting units, Defense monitors and appropriate audit offices. The handbook will be updated every six months. □

*New handbook is examined by Ling-Temco-Vought, Inc., Cost Reduction Managers at a meeting in Dallas, Texas, chaired by Mr. Howard E. Lee (center), LTV's Corporate Manager of Cost Reduction and Analysis. Mrs. Barbara Adams, LTV secretary, hands copy of handbook to Mr. Robert King, LTV Corporate Work Simplification Administrator. Studying the handbook to Chairman's left are Mr. B. B. Gartrell, Division Cost Reduction Coordinator for LTV Electrosystems, Inc., and Mr. H. L. A. Utrecht, Manager of Management Systems and Controls for LTV Aerospace Corporation.*



## RARE PAIR REPAIR FLARES

It was indeed a dark day when Picatinny Arsenal's new illuminating flares did not ignite properly. The flares in question are cylindrical type, measuring about five inches long, and are packaged in quantities of 16 for aerial delivery. When electrically initiated, they are ejected from their launcher and simultaneously ignited. The only problem was that many were headed for the scrap heap because they failed to ignite.

Investigation revealed that the igniter composition used was too insensitive to the tiny explosive "squib" or detonator, and a harder push was needed to start the burning process.

The outlook brightened when the Arsenal paired the talents of Mr. Neil Lampner and his supervisor John Mola from the Methods Engineering Division. These engineers found that the rejected flares could be saved by dabbing a new igniter composition on a critical point near the detonator mechanism. This composition increased the sensitivity of the igniter so that the explosive train would start at the proper time.

By renovating the rejected flares, the scrap pile was avoided, and the Government realized savings of

\$269,300. The Lampner-Mola idea worked so well that all new flares of this type are being produced with the improved igniters. □

*Neil Lampner, standing, and John Mola, seated, hold samples of repaired flares and their aerial delivery package.*



## NEW PAIR OF HOSE

At Luke AFB, Arizona, an 18-inch black rubber hose is saving the Air Force nearly \$200 a year. The rubber hose is part of a flexible water cooling line used on each of the four 1,250-kilowatt diesel generators that produce power needed by the Air Defense Command's 27th Air Division for its direction control center.

There are two generators in operation 24 hours a day with another two on standby or in maintenance. The water supply and discharge lines to the heat exchanger are used in regulating the heat of the air going into the diesel generator.

Formerly, the water lines were joined to the generator by a flexible connector made of corrugated steel with a braided brass woven support jacket. These connectors required frequent replacement. The replacement cost amounted to \$125 plus labor for each

section.

The idea was conceived to use two rubber hoses with metal linings instead of the steel connectors. The rubber hoses were readily available at base supply for only \$1.25 each. The change worked without any problems, and the life expectancy of the rubber hose is more than twice that of the expensive connector.

Mr. John Riley, Director of Civil Engineering for the 27th Air Division says, "This little idea is expected to produce considerable savings for Luke AFB over the years." (*The Journal agrees with Mr. Riley. While a single application of the idea produces relatively small savings, we think this is an excellent example of a savings action that can mount considerably in value as the idea is emulated by other installations and activities faced with the same problem.*) □

*In the before and after photos below, Technical Sergeant Irving J. Allread, NCOIC of Civil Engineering for the 27th Air Division, Luke AFB, Arizona, points to the old expensive metal connectors for attaching water lines to diesel generators and to the substituted rubber hose.*



## MORE "WOW"

At the annual conference of the National Association of Suggestion Systems held in Washington, D.C., during October, the Navy received a handsomely engraved plaque acknowledging its Campaign WOW (War on Waste) as the best promotional effort conducted by Government agencies having 5,000 or more employees.

*The photo at right shows G. E. Joseph (left), administrator of the Navy Incentive Awards Program and N. B. McCune of the Navy Cost Reduction Directorate exchanging congratulations on receipt of the plaque. Campaign WOW was a joint effort of their two offices.*

Campaign WOW increased employee cost reduction suggestions by 400%. □



## \$4,375 AWARD TO AFLC'S TOP SUGGESTER

Mr. Robert M. Callaghan of Oklahoma City Air Materiel Area, Tinker AFB, was top suggester in the Air Force Logistics Command for FY 1966.

Callaghan, who transferred in June from Middletown Air Materiel Area (MAAMA), Olmsted AFB, Pa., was responsible for initiating a suggestion that saved the Air Force over \$3.3 million. Callaghan was awarded \$4,375 from three different levels of review. The Materiel Area at Olmsted AFB made an initial award of \$1,000; the Logistics Command added another \$1,000; and the Headquarters U.S. Air Force added the frosting to the cake with a further award of \$2,375.

While employed in the Instrument Systems Division of the Directorate of Materiel Management at MAAMA, Callaghan urged the application of strict accounting procedures in requirements determinations for costly items (Hi-Value items) in the Air Force inventory. The more precise procedures made it possible to reduce stock levels for these items from 30 to 10 days at the base level and from 15 to 5 days at the depot level. His idea lowered purchase requirements by more than \$3.3 million. □

## ORGANIZING FOR EFFICIENCY AND ECONOMY

Several important management "tools" are available to field installations and activities to help them carry out their missions more economically and effectively. Among these "tools" are the Cost Reduction Program, the Employee Suggestion and Incentive Awards Program, the Management Improvement Program, the Zero Defects Program, and techniques such as DIMES, Work Simplification, Value Engineering, etc.

Seeing that these programs are properly implemented, adequately controlled, and produce the desired results can put quite a strain on the commanding officer and his staff if the command is not properly organized to handle them.

In some instances, valuable techniques might be neglected because of higher priority attention given to other programs. In other cases, some of the older efforts may even become so entrenched in the organizational setup over the years that the "newcomers" seem competitors rather than additional tools of management. Differences in reporting requirements and the fact that some results may meet criteria for reporting in more than one of the identified programs compound the problem of coordinating these efforts into a cohesive package.

As an example, suppose an employee proposes a

new work method through the Suggestion Program. If accepted, the method may be put into practice under the Work Simplification Program. The results may be reported in the Cost Reduction Program provided monetary savings are produced and the action meets the criteria of that program. Even if the results do not meet Cost Reduction reporting criteria, the accomplishments can still be reported under the Management Improvement Program.

From the above it readily can be seen that keeping these programs moving in the same direction toward the common goal of increased economy and effectiveness of operations presents a real challenge to management.

Fort Huachuca, Arizona, is well on its way to proving that it has found a sound solution. All programs of the type mentioned have been placed under the control of a single organizational unit. Fort Huachuca's Special Programs Office, now 6 months old, is literally paying its own way in increased accomplishments and savings from the several programs it manages. The Special Programs Office was established April 1, 1966, on a trial basis under a Department of the Army approved project.

Mr. Guy C. Bevers who heads the organization says that the pilot program will continue to operate as such for the remainder of FY 1967. At the end of the trial period it is expected that the prototype will be extended to other Army installations, and may be adopted Army-wide.

Bevers went on to say that the employees in the new office are all specialists in their respective fields, whether

*The name "Pop Quality" won Sgt.Maj. Langus Olson of Automatic Data Field Systems Design Agency \$100 in prize money in the recent contest to identify Ft. Huachuca's Zero Defects Gent (center). Maj.Gen. Benjamin H. Pochyla presented the cash award July 5. The name was picked from more than 1400 entries submitted by post personnel.*



it be incentive awards, cost reduction, zero defects, etc. Since the establishment of the pilot program, these specialists have been cross-trained to gain the proper perspective on the part each program plays in the overall scheme of things.

All ideas, management improvement actions, error cause identifications, innovations and new techniques now are carefully scrutinized to see if they can be applied to one or perhaps all of the programs. All accomplishments are given a coordinated review to assure that they are properly reflected in appropriate reports. Bevers keeps a sharp lookout to make sure that all programs receive the right amount of emphasis and that no single program is benefiting to the neglect of the others.

Will this approach work? The answer is reflected in the results of the first quarter's (FY 1967) experience under the new organization. Here are some samples. Cost reduction reports showed \$313,000 of validated savings as opposed to \$41,400 reported for the same period last year. Savings from adopted suggestions under the Incentive Awards Program reached \$194,100 against \$5,200 for the first quarter of last year. Savings through Work Simplification were \$71,228 for the first quarter of FY 1967 as compared with \$21,000 for all of FY 1966. □

## FEATHERBEDDING

Army depot personnel in Nahbollenback, Germany pondered—"What do you do with old, soiled pillows? Replace them with new ones, or renovate the old ones?"

At a saving of \$1.25 per pillow, Nahbollenback Depot is giving new life to old pillows. They accomplish this in their pillow renovation plant that can recondition 250 pillows a day.

Pillow overhaul includes preparing new covers cleaning and sterilizing the old feathers, and filling the new covers with the renovated feathers. Result—a like-new pillow, ready for issue. □

*The photo shows Herren Rienhardt, right, and Erick Heidrich, employees of Nahbollenback General Depot, Germany, operating one of the machines in the pillow renovating plant.*



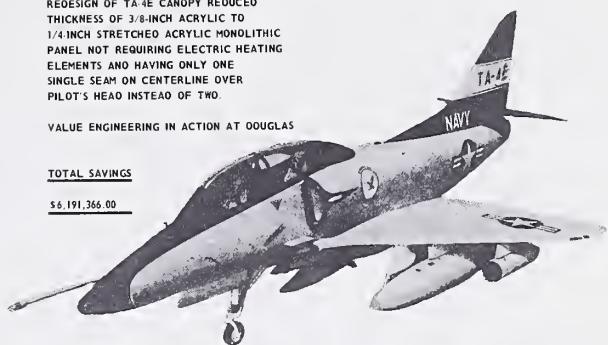
## VALUE ENGINEERING

REDESIGN OF TA-4E CANOPY REDUCED THICKNESS OF 3/8-INCH ACRYLIC TO 1/4-INCH STRETCHED ACRYLIC MONOLITHIC PANEL NOT REQUIRING ELECTRIC HEATING ELEMENTS AND HAVING ONLY ONE SINGLE SEAM ON CENTERLINE OVER PILOT'S HEAD INSTEAD OF TWO.

VALUE ENGINEERING IN ACTION AT DOUGLAS

TOTAL SAVINGS

\$6,191,366.00



## INCREASED REPRODUCTIVITY

A search for newer and better office reproduction equipment at the Air Reserve Personnel Center in Denver, Colorado, saved the Air Force \$7,410 in the past 10 months—and the savings will continue to mount.

As personnel manager for some 400,000 Air Force Reservists, the Center must copy a number of personnel documents needed for the master personnel records. These are done on office copiers—the reproduction equipment used for small numbers of copies. The equipment used was leased at \$25 per month for each machine, with a charge of 3½ cents for each copy reproduced. Four machines were required to handle the workload. Supplies needed for these machines raised the cost another cent per copy. The equipment also had size limitations so that larger documents had to be re-exposed to reproduce the entire document. The number of copies averaged 48,000 per month, plus about 5,000 second exposures for the larger documents. Total cost per month: \$2,485.

A search for more efficient equipment led to a newer machine which could reproduce the documents at twice the speed and at half the cost. This machine could also take large sizes of copy up to 14 x 20 inches, without a second exposure. Rental on each machine was \$210 per month, with no limit or separate charge on number of individual copies made. Paper costs varied according to the size.

Three of the new machines were rented to replace the four machines previously used. The total cost dropped to \$1,744 per month, including rent, paper, and chemical toner.

Net savings from use of the new equipment amount to \$741 per month, or a total of \$7,410 for the 10-month period the machines have been in use. The machines will continue to turn out savings month after month after month. □

## SOME LOCKHEED DOLLAR SAVERS

Recent Lockheed Aircraft Corporation cost reduction items reported by the corporate headquarters at Burbank, California, include:

- Savings of \$220,982 in the P-3 Aircraft Program from Lockheed-California Company—by designing a test cradle which simulates aircraft maneuvers in flight, thereby eliminating actual flights for preliminary check-out of P-3 magnetometers.
- Savings of \$162,729 in the Agena Program from Lockheed Missiles and Space Company—by photographing soiled or damaged vellum drawings, retouching the photo negative and reproducing new vellums from the negative instead of replacing them by conventional hand drafting on a drawing board.
- Savings of \$169,828 in the C-130 and C-141 Aircraft Programs from Lockheed-Georgia Company—by reducing the cost of parts made by stretch forming through affixing sheets of teflon to certain stretch form blocks, thereby eliminating rework on parts previously damaged by metal-to-metal contact of block and parts.
- Savings of \$34,760 in the C-141 Aircraft Program from Lockheed Aircraft Service Company—by packing five separate fiberglass antenna panels in one box, using pre-formed styrofoam inserts for protection, instead of wrapping the five parts individually in brown paper and packing them in three boxes with shredded paper for cushioning. □

## CASH AWARDS FOR MILITARY

Smiles are included in the "uniform of the day" as four Navy military personnel at the Naval Air Station, Pensacola, Florida, receive cash awards for their cost savings suggestions. Under the recent change to regulations, cash awards, formerly available only to civilian employees, are now authorized for military personnel as well. Shown in the photo below are four of the first group of recipients qualifying under the new rule. The quartet (left to right), J. W. Sprouse, senior chief storekeeper; C. R. Strange, training device technician 2d class; R. B. Dowdy, dental technician 1st class; and LCDR N. C. Bild were awarded a total of \$275. CAPT. H. Cordie Weart, CO, NAS, Pensacola, presented the awards. □



## PAINTING PROBLEMS UNMASKED



*(l. to r.) G. B. Lucas, Industrial Engineering Technician; E. L. Waldron, Leadingman Painter; and R. H. Wheat, Chemist, explore the need for improving the old method of protecting rubber components during paint operation.*

Dissatisfaction with the "old way" is often the first step in developing an "improved way" of accomplishing the job. This has been demonstrated many times at the Naval Air Station Jacksonville, Florida. The experience of E. L. Waldron, Leadingman Painter in the Power Plant Division, is a good example.

Concern over the man-hours and material required to mask and unmask engine baffles intake pipes and air ducts, to protect rubber components during the paint operation, prompted this supervisor to begin a study of the problem. Industrial Engineering Technician G. B. Lucas, of Methods and Standards Division, and R. L. Griffin of Materials Engineering, were invited to join the study team. Study results and evaluation tests revealed that the paint was not detrimental to the rubber components, and further, that priming prior to application of the heat-resisting enamel finish coat was not necessary. Engineering permission was granted to deviate from the Handbook of Overhaul Instructions.

A saving of 2.05 man-hours and 60 cents in material has been realized for each of the 1624 reciprocating engines recently processed. Total savings of \$51,000 were claimed for FY 1966. Personnel responsible for the idea were rewarded with a payoff of \$190. □



*Joint meetings of Defense and Industry Cost Reduction Program representatives have been well attended in the past. Above photo shows joint meeting held at Hotel Governor Clinton, New York City, in February 1965.*

## CONTRACTOR PROGRAM WORKSHOPS PLANNED

Working-level Defense and industry cost reducers will exchange ideas at eight regional 2-day workshops in February, March, and April.

The purpose is to develop an even stronger Defense Contractor Cost Reduction Program.

These will be true "workshops" with panels on:

- Value Engineering and Other Interface Area Criteria
- Critique on Proposed Revised DoD Instruction on Contractor Program
- Audit Validation and Reporting Channels in Interface Areas
- Review of Guidelines for Contractor Program

There will be a minimum of formal presentations from a Pentagon briefing team. Emphasis will be on

problem-solving and developing recommendations which will improve the Contractor Cost Reduction Program and the Defense Internal Program.

One "host" DoD component in each city (see schedule below) will coordinate local arrangements. Working-level participation by local representatives from plants and divisions of the 82 parent corporations currently in the Defense Contractor Cost Reduction Program will be invited. Assigned DoD monitors in the area and their Cost Reduction Coordinators will be represented, as will local Defense audit offices.

The Washington DoD team will be made up of the Coordinator, Defense Contractor Cost Reduction Program, and Value Engineering and audit experts from the Office of the Secretary of Defense. Army, Navy, Air Force, and Defense Contract Administration Services will each have members on the team. Problems not resolved at the workshops will be carried back for further work by the team.

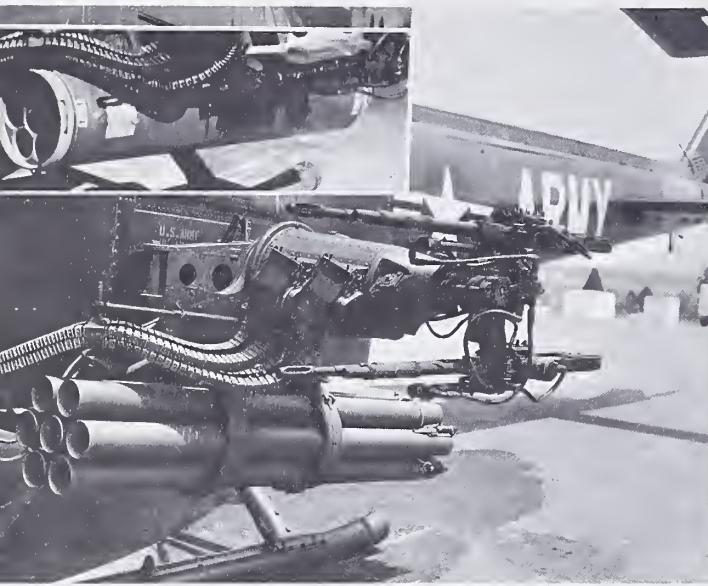
At the workshops, each panel will discuss proposed solutions for problems related to the panel's topic.

These workshops are expected to be a worthwhile and productive follow-on to the eminently successful series of briefings held about 2 years ago in seven cities. □

### SCHEDULE FOR 1967 DEFENSE/INDUSTRY WORKSHOPS

Dates	City
February 14 and 15	St. Louis, Missouri
February 16 and 17	Dallas, Texas
March 7 and 8	New York, New York
March 9 and 10	Boston, Massachusetts
March 21 and 22	San Francisco, California
March 23 and 24	Los Angeles, California
April 11 and 12	Chicago, Illinois
April 13 and 14	Philadelphia, Pennsylvania

## LAUNCHER LIFE LENGTHENED



Shown above is a photo of the improved version of the 2.75" Rocket Launcher XM-158. The inset at upper left shows the launcher before VE study.

## HONEY OF AN IDEA FROM BEEVILLE



The Naval Auxiliary Air Station, Chase Field, Beeville, Texas, has been a virtual beehive of activity since the enactment of Public Law 89-198 which allows cash awards to the military for savings ideas. A drive to be among the first naval activities to officially report the payment of one of these awards has kept things buzzing.

Chief Petty Officer Joseph A. Patren, of the Station's Aviation Equipment Branch, was a recent winner (see photo above). Chief Patren received a check for a liquid oxygen trailer configuration. The improved design eliminates a problem of excessive breakage of transfer hoses and greatly simplifies servicing of aircraft. His idea is expected to save the station more than \$2,300 each year. □

Until the Army Missile Command set up a study, the operational life of each 2.75 Rocket Launcher (XM-157) used on the UH-1B Helicopter averaged only 175 rockets.

With their mission defined—increase the operational life and identify other possible improvements—the Value Engineering types took off. Their findings resulted in the development of a new version of the launcher, the XM-158 which incorporated five major changes:

1. Increased launcher tube wall thickness.
2. Anodized the inner surface of the tubes.
3. Eliminated the metal shroud around the tubes.
4. Redesigned the firing arm and detent.
5. Added wiring protection against rocket blast.

The payoff is impressive. Operational life of each XM-158 zoomed to 3,500 rockets compared with the 175 rockets per XM-157 launcher. The longer life reduced planned procurement by 14,055 launchers, resulting in savings of \$3,893,886. □

## COMPANY PRESIDENT AWARDS CERTIFICATES



Mr. L. Eugene Root, president of Lockheed Missiles & Space Company, Sunnyvale, California, recently took a personal "Look See" at areas which had reported outstanding savings in the company's "Cost Improvement Program."

Lockheed MSC employees whose cost-reducing ideas particularly impressed Mr. Root received an achievement certificate. One of the awardees was Mr. Gerard H. Bosco (left in photo) shown receiving a certificate from Mr. Root for saving \$34,270 on acoustic testing costs. □

## ENVELOPES REPLACE TAPE FOR GOOEY TASK

Mr. Raymond Stewart of the Lexington-Blue Grass Army Depot hit upon the right solution to a sticky problem and earned a cash award of \$530 for his efforts.

Before Mr. Stewart submitted his suggestion, 1-inch wide pressure sensitive tape was used to fasten packing list envelopes to fiberboard containers. A staple gun served the purpose in the case of wooden containers.

Since packing lists come in different sizes, and require various sized envelopes, from 20 to 48 inches of tape was needed to fasten an envelope to a container. Using this method cost \$25,974 per year.

Mr. Stewart suggested that adhesive backed packing list envelopes be substituted for the tape and staple processes. The new method reduced annual costs to \$14,820, resulting in savings of \$11,154 per year. □

## PROMPT PAYMENT DISCOUNT

If John Q. Citizen can get a discount for paying his electricity bill promptly, why can't the Army? This is the type of question Mr. Alex Smallberg of the Procurement Directorate, Fort Detrick, asked and got a highly favorable response. As a result of his prompting, the local electric company was contacted to determine if Fort Detrick could receive a prompt-payment discount. The company agreed, and the proposal was

approved by the Public Service Commission of Maryland. The contract for electric service was amended and now contains the following provision: "Prompt payment discount—a discount of 1% will be allowed on the monthly billing, provided the monthly bill is paid in full within 10 days after date of bill, and all previous bills are paid." This cost reduction action has produced annual savings approximating \$5,000. □

## CONARC HOLDS

Fifty cost-reduction representatives from the Department of the Army, the Army Audit Agency, the Continental Army Command (CONARC) and Fourth, Fifth, and Sixth Armies gathered at Fourth Army Headquarters, Fort Sam Houston, Texas, on the 11th and 12th of October for the second regional CONARC cost reduction seminar this year. (A similar meeting was held at Fort McPherson, Georgia, on 26-27 September for the Eastern region of CONARC.)

Project TRIM (Target: Revitalized Installation Management, is the CONARC version of the Army Cost Reduction Program. Project TRIM seminars are held each year to provide a forum for exchange of experiences and ideas among the various people involved in the cost reduction effort.

In addition to a discussion of local field problems and the exploration of new savings techniques, representa-

## "TRIM" SEMINAR

tives from Headquarters Department of the Army and Headquarters, CONARC were on hand to provide the latest information on the overall program and to give on-the-spot guidance in specific problem areas.

Maj. Gen. Edward C. Dunn, Fourth Army Chief of Staff, opened the seminar in the main conference room at Fourth Army Headquarters with a message of welcome to the conferees. Among the conference speakers were Col. O. R. Fox, Deputy Chief, Logistics Management Div. Hdq., USCONARC; Mr. Ray C. Chase, Jr., Chief, Army Cost Reduction Group, ODCS-LOG, Hdq. DA; Mr. E. C. Francis, Project TRIM Project Officer, ODCSLOG, Hdq. USCONARC; Mr. Horace Williams, Cost Reduction Coordinator, U.S. Army Missile Command, Redstone Arsenal, Ala.; and Mr. J. H. Weigand, Logistics Management Div., Hdq. Fourth Army. □

*Conferees take a brief respite from their discussions of cost reduction during USCONARC's two-day Project TRIM seminar recently held at Hdq. Fourth Army, Fort Sam Houston, Texas.*



## NAVY EMPLOYEE RE-COVERS CATALOG

"It's always been done that way," wasn't enough of a reason for Miss Adeline C. Trevenen, a Supervisory Supply Systems Analyst at the Fleet Material Support Office, Philadelphia, to ignore what she considered to be an excellent opportunity to pick up some dollar savings for the Navy.

It has been standard practice for Federal Supply Catalogs to be bound with a separate cardboard (200-pound chemical wood tanboard) cover costing 3½ cents each. The Federal Manual for Supply Cataloging specifies use of the separate covers.

Miss Trevenen knew that most supply catalogs are reprinted approximately every 18 months, thus reducing the need for strong outer covers. Also, it is customary

for users to file these catalogs in racks or place them in hard cover binders which provide additional protection.

Miss Trevenen suggested that the Navy eliminate the heavy cardboard cover from all basic and revised Federal Supply Catalogs and use covers printed on the same paper stock that is used for the rest of the manual. The cost of the paper cover would be .001 cents as compared with .035 cents for the heavier covers. Her suggestion was forwarded by the Navy to the Defense Logistics Services Center for evaluation. As a result, DSA issued a directive authorizing all Navy supply catalogs to be printed with the lower cost paper covers.

This pennysaving idea produced savings exceeding \$20,600 the first year. □

## ERROR FREE ANNIVERSARY



As might be expected, we could find nothing wrong with Wright-Patterson AFB's float which commemorated their first anniversary of special emphasis on Zero Defects.

At the extreme left of the photo Cheryl Robins, left, and Donna Pinti, right, call attention to a message of congratulations to Base employees from Maj. Gen.

Charles H. Terhune and other officials for a year of successful results under the Zero Defects Program. At the other end of the float, left to right, Josie Pruitt, Nancy Dawson, and the ZD Queen Susan Kurtz (Miss Wright-Patterson, 1965) offer a generous slice of the anniversary cake to one and all as the float carries its Zero Defects message throughout the Base. □

## NOTHING SUCCEEDS LIKE SUCCESS

Last July J. Robert Bennett, a packaging specialist at Air Force's Ogden Air Materiel Area, reached the pinnacle of recognition for cost reducers when he was called to Washington, D.C., to receive a special award from the President of the United States for his noteworthy savings efforts. At that time he was cited for a cost-reduction action which saved the Air Force over \$2 million in the packaging of bomb fin assemblies.

Not one to rest on his laurels, Bennett has been alert for new opportunities for cost savings. His latest idea, recently reported to the Journal, is a suggestion for lightweight and inexpensive packaging of aerial spray tanks. This improvement has already saved \$204,355 and will produce equivalent annual savings in future years. But that isn't all! Bennett has still other ideas that he is working on which he thinks may also pay off

in substantial savings for the Air Force.

It was Bennett's belief that a better way can be found to do most anything that placed him among those who were identified by President Johnson during the Pentagon Cost Reduction Award's ceremony in July as "representative of a new spirit of creative management." In addressing Bennett and his fellow awardees the President said, "You are men and women—not merely who have saved your Nation certain costs—but men and women who have made it your personal responsibility to contribute to better management of this Nation's resources. That is what Cost Reduction really means. It is not merely saving money. It is, rather, creating more resources—resources which can be used to build a better, a more decent, a more developed, and a more just and rational world." □

## NAVY SCRUTINIZES UTILITIES BILL

The Navy Facilities Engineering Command negotiates utility rates and administers some 12,000 accounts for utility services (such as electricity, natural gas, water, communications, sewerage disposal, etc.) for the Naval Shore Establishment.

Expenditures for these services run to \$90 million annually.

The commands keep a weather eye on all changes in rates, operating conditions, and levels of use to find opportunities to reduce costs.

Here are two examples of results:

- Naval Hospital, Oakland, California, invested \$12,325 to convert its Central Powerplant from fuel oil to natural gas. As a consequence, the hospital was able to amortize its capital investment in less than 1 year, avoid expenditure of \$40,505 needed to control

a soot problem resulting from use of fuel oil, and realize an annual rate of savings of \$13,698.

- Naval Air Station, Patuxent River, Maryland, made a cost-of-service study of its electric power requirements to determine whether the rate charged by the supplier was excessive in relation to the cost-to-serve, and whether recurring power factor penalties in billings to the station should be eliminated. The study revealed that the supplier was realizing \$69,622 on the sale of power to the Navy over and above the cost to purchase and deliver it to the Navy-owned substation. This finding led to a new contract at a lower rate, which resulting in annual savings of \$44,000 and an additional savings of \$81,047 by making the new rate retroactive to August 1963. □

## SUB REPAIR VE'D

A major fix-up job seemed likely when ultrasonic inspection techniques disclosed a crack in the hull plating of a nuclear submarine next to and just below the primary shield tank in the reactor zone.

Normal repair procedure for correcting hull plates is to dismantle the defective portion of the plate, remove its 3-inch lead shielding, drain the primary shield tank, correct the defective area, and replace all materials. This process is expensive and time consuming.

Norfolk Naval Shipyard engineers decided to have a Value Engineering team look for a way to repair the hull plate without disturbing the reactor zone. The VE team suggested using a milling machine outside the hull to cut out the defective area. Then, by use of rigid control techniques, new plate material could be welded to the hull. Testing proved out the method which, according to reports from Norfolk Navy Shipyard, saved Navy \$470,580. □

Harold Russell  
*Chairman*



# The President's Committee on Employment of the Handicapped

WASHINGTON, D.C., 20210

FOR RELEASE: TUESDAY PM'S

## DEPARTMENT OF DEFENSE CITED BY PRESIDENT'S COMMITTEE FOR SUPPORT OF SHELTERED WORKSHOPS

Washington, D. C., December 20 -- The Department of Defense was cited today for "outstanding support and cooperation given to encourage more defense business for sheltered workshops" by Harold Russell, Chairman of the President's Committee on Employment of the Handicapped.

The commendation was presented to Assistant Secretary of Defense for Installations and Logistics, Paul R. Ignatius, for the efforts the Department of Defense is making to increase employment opportunities for the disabled who receive on-the-job training in workshops.

During the brief presentation ceremony in Secretary Ignatius' office, Chairman Russell highlighted the four-pronged program Defense has developed to help workshops:

1. The Department has printed and distributed to all procurement officers throughout the country a directory, which lists the productive capabilities of over 200 workshops. In the Preface, Secretary Ignatius states, "Sheltered workshops can supply a wide variety of goods and services at competitive prices. Procurement officials in the military departments and the Defense Supply Agency should consider including workshops on bidders' lists for items they can produce .... The Department of Defense benefits through new sources and increased competition, and our society benefits by extending opportunities for productive work to persons who, by reason of their handicap, have not always enjoyed it."

2. A leaflet, carrying the Department's endorsement of the workshop program and encouraging prime contractors to "give workshops every opportunity to compete for subcontracts," is attached to every prime contract let by the Department of Defense. The leaflet has been in use since 1964.

3. Schedules of locally sponsored Defense procurement clinics, held throughout the country, are made available to workshop directors so that they can attend those held in their vicinity.

4. The Department's professional management magazine, COST REDUCTION JOURNAL, has widely publicized the capabilities of sheltered workshops.

Chairman Russell concluded his remarks by saying, "The Department of Defense has done a superb job to help those who aren't quite ready to help themselves. The benefits of this program extend beyond the 100,000 handicapped people in workshops to their families, their communities, and the nation's economy."



*A certificate commending the Department of Defense is presented to Assistant Secretary of Defense Paul R. Ignatius by Harold Russell, Chairman of the President's Committee on Employment of the Handicapped. (See story on opposite page.)*



*The little tailor in the fairy tale killed "7 with one blow." Navy personnel in Guam top his record and save \$2,800 a year to boot. (See story, pages 23 & 24.)*

## **Journal Postscript**

Editors receive letters. Most are nice letters—and they are answered promptly. A few are unhappy letters telling us we dropped a pica or misspelled a name or failed to identify the blonde in the photo. These we answer in due course—with a promise that our future policy will be ZEHO DEPECTS. Honest!

Recently, a nice letter praised the Journal's professional layout and neat look, and asked us how it was printed. Curious, we paddled off to the cavernous Government Printing Office to find out.

We discovered that the GPO building houses 162

*A pressman adjusts press at the point where the paper passes between cylinders which transfer images simultaneously to both sides of the paper.*



assorted presses, 383 typesetting and casting machines, and 7,400 people in 32½ acres of floorspace. The Journal, we learned, is printed on an offset web press whose two-tiered mass dominates a 40-by-40-foot room. The press reproduces 64 pages at a clip and pumps out the Journal at a 17,000-copies-per-hour rate. A 43-inch wide sheet of paper feeds into the machine. (We were told that the GPO annually consumes some 224 million pounds of paper—enough to fill 3,100 freight cars and 2,200 trucks.)

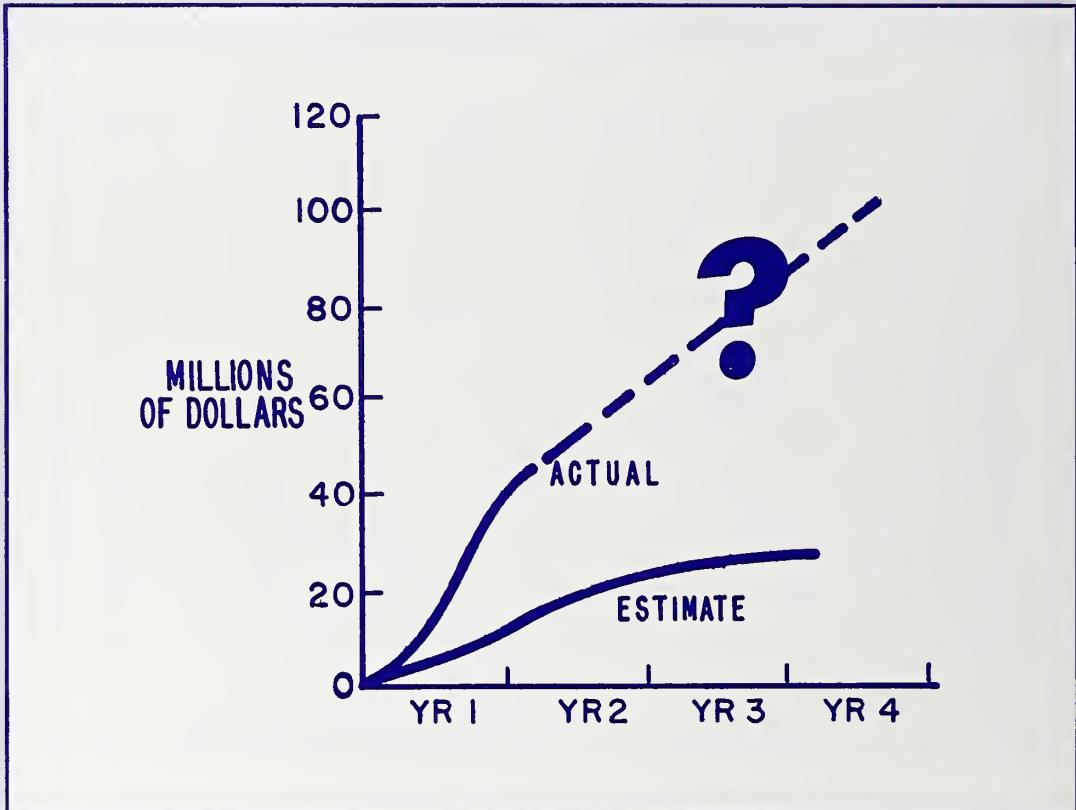
We thought Journal readers might like to see the press. It is reproduced below.

*Joan Steele, a secretary in the OSD Cost Reduction Directorate, displays a copy of the Journal at the trim-and-fold delivery end of the giant web press. At left in photo is a partial view of the complex control panel.*





3 1262 09304 8196

**FLARE***How Much Will it Cost?**(See page 26)*